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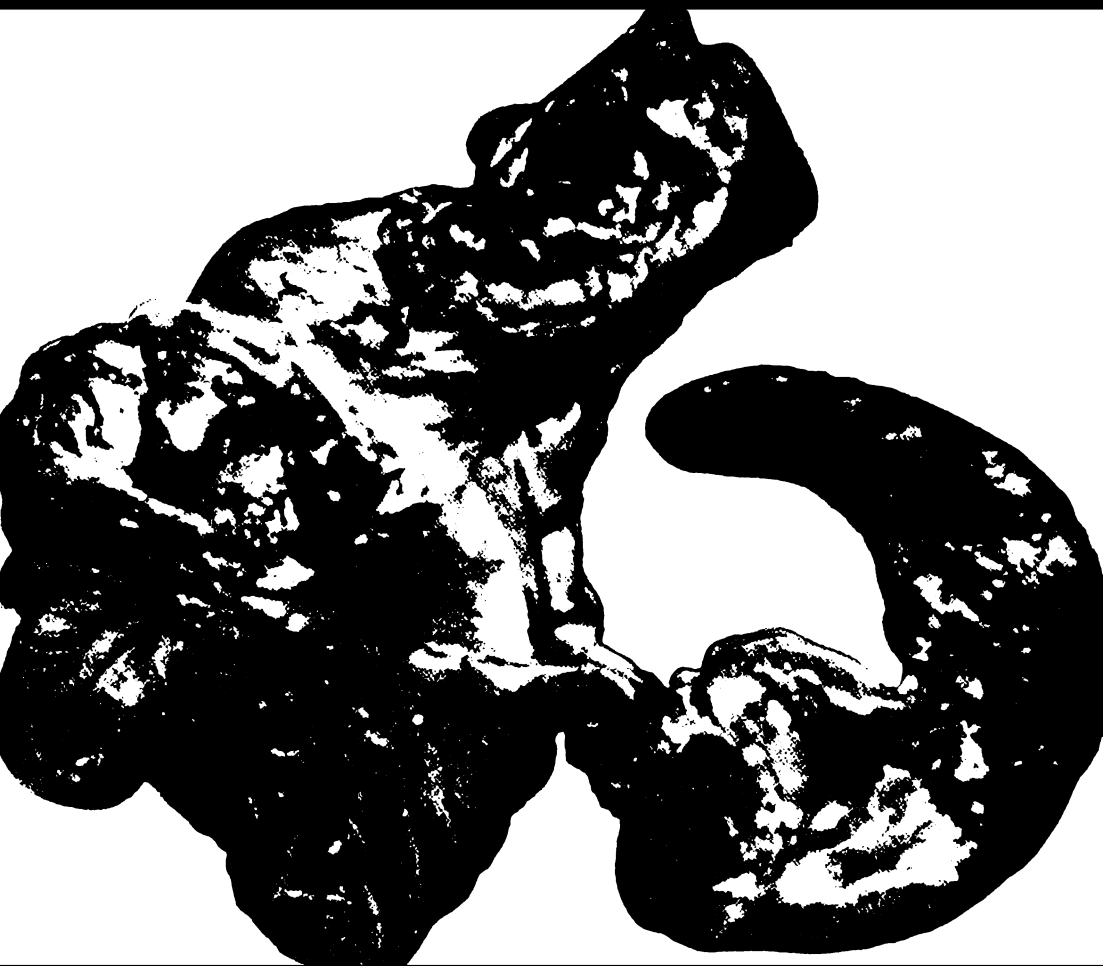

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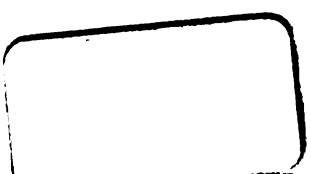

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TRANSACTIONS

OF THE

COLLEGE OF PHYSICIANS

OF

PHILADELPHIA.

THIRD SERIES.

VOLUME THE NINETEENTH.

PHILADELPHIA:
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The Committee on Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

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1897.

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ELECTED	
1787	JOHN REDMAN
1805	WILLIAM SHIPPEN
1809	ADAM KUHN
1818	THOMAS PARKE
1835	THOMAS C. JAMES
1835	THOMAS T. HEWSON
1848	GEORGE B. WOOD
1879	W. S. W. RUSCHENBERGER
1883	ALFRED STILLÉ
1884	SAMUEL LEWIS
1884	J. M. DA COSTA
1886	S. WEIR MITCHELL
1889	D. HAYES AGNEW
1892	S. WEIR MITCHELL
1895	J. M. DA COSTA

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FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

DECEMBER, 1897.

* Non-resident Fellows.
† Fellows who have commuted dues.

ELECTED.

*1883. ABBOT, GRIFFITH E., Ph.D., M.D., Washington, D. C.

1892. ABBOTT, ALEX. C., M.D., Professor of Hygiene, and Director of Laboratory of Hygiene, University of Pennsylvania.

1870. ADLER, JOHN M., M.D.

1876. ALISON, ROBERT H., M.D.

1873. ALLIS, OSCAR H., M.D., Clinical Lecturer on Orthopædic Surgery in Jefferson Medical College, and Surgeon to the Hospital of the same; Surgeon to the Presbyterian Hospital.

1896. ALLYN, HERMAN B., M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Visiting Physician to St. Joseph's Hospital; Medical Registrar, Philadelphia Hospital.

1888. ANDERS, JAMES M., M.D., Professor of Hygiene and Clinical Diseases of Children in the Medico-Chirurgical College, Philadelphia; Physician to the Philadelphia Hospital.

1869. ANDREWS, T. HOLLINGSWORTH, M.D., Consulting Surgeon to the Hospital of the Good Shepherd, Radnor; Medical Director of the Bureaus of Police and of Fire in the Department of Public Safety.

1896. ANGNEY, WILLIAM M., M.D.

*1882. ASHBRIDGE, RICHARD, M.D., West Whiteland, Pa.

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ELECTED

1863. Ashhurst, John, Jr., M.D., LL.D., Barton Professor of Surgery and Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital and to the Children's Hospital; Consulting Surgeon to St. Christopher's Hospital, to the Woman's Hospital, and to the Hospital of the Good Shepherd, Radnor.

1865. Ashhurst, Samuel, M.D., Surgeon to the Children's Hospital.

1893. Ashton, Thomas G., M.D., Chief of Out-patient Medical Department, Jefferson Medical College Hospital; Demonstrator of Clinical Medicine, Jefferson Medical College; Visiting Physician to St. Mary's Hospital, Philadelphia.

1857. Atlee, Walter Franklin, A.M., M.D., Corresponding Member of La Société des Sciences Médicales de Lyons; Consulting Surgeon to St. Luke's Hospital, Bethlehem; Visiting Physician to the Preston Retreat.

1852. Bache, Thomas Hewson, M.D.

1883. Baer, Benjamin F., M.D., Professor of Gynecology in the Philadelphia Polyclinic.

†1892. Baker, George Fales, B.S., M.D., Surgeon to Out-patient Department of St. Joseph's Hospital.

1879. Baker, Washington H., M.D., Obstetrician to the Maternity Hospital.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital and to the Gynecological Out-patient Department of the Pennsylvania Hospital.

1880. Bartholow, Roberts, M.D., Professor (Emeritus) of Materia Medica, General Therapeutics and Hygiene in Jefferson Medical College.

1894. Barton, James M., M.D., Surgeon to the Jefferson Medical College Hospital and to the Philadelphia Hospital.

1883. Baum, Charles, A.M., M.D., Ph.D.

1873. Baxter, H. F., M.D.

1883. Beates, Henry, M.D.

1860. Benner, Henry D., M.D.

1874. Bennett, W. H., M.D., Physician-in-charge to the Children's Seashore House for Invalid Children, and to the Seaside House for Invalid Women, Atlantic City.

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ELECTED

1896. BEYEA, HENRY D., M.D., Instructor in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital.

†1884. BIDDLE, ALEXANDER W., M.D.

1884. BIDDLE, THOMAS, M.D.

*1866. BLACK, J. J., M.D., New Castle, Del.

1894. BLISS, ARTHUR AMES, M.D., Laryngologist to the German Hospital; Laryngologist and Aurist to the Pennsylvania Institution for the Deaf and Dumb.

*1867. BOARDMAN, CHARLES H., M.D., Boston, Mass.

1894. BOCHROCH, MAX H., Instructor in Electro-therapeutics and Chief Clinical Assistant in the Nervous Department, Jefferson Medical College Hospital.

1896. BOGER, JOHN A., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Samaritan Hospital; Surgeon to the Dispensary of the Episcopal Hospital.

1891. BOYD, GEORGE M., M.D., Lecturer on Obstetrics in the Medico-Chirurgical College; Physician to the Philadelphia Lying-in Charity and Nurse School.

†1884. BRADFORD, THOMAS HEWSON, M.D., Physician to the Dispensary of the Children's Hospital and Surgeon to the Gynecological Out-patient Department of the Pennsylvania Hospital.

1856. BRINTON, JOHN H., M.D., Professor of the Practice of Surgery and of Clinical Surgery in the Jefferson Medical College; Consulting Surgeon to the Southwestern Hospital of Philadelphia.

1891. BRINTON, LEWIS, M.D., Visiting Physician to the Nervous Department of the Howard Hospital.

1887. BRUBAKER, ALBERT P., M.D., Professor of Physiology and General Pathology in the Pennsylvania College of Dental Surgery; Demonstrator of Physiology in Jefferson Medical College; Lecturer on Anatomy and Physiology at the Drexel Institute.

*1890. BRUSH, EDWARD N., M.D., Medical Superintendent of the Shepherd Asylum, Towson, Md.

*1851. BULLOCK, WILLIAM R., M.D., Wilmington, Del.

1887. BUNTING, Ross R., M.D.

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1870. BURNETT, CHARLES H., M.D., Professor (Emeritus) of Otology in the Philadelphia Polyclinic; Clinical Professor of Otology in the Woman's Medical College; Aural Surgeon, Presbyterian Hospital; and Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, West Philadelphia Hospital for Women, and the Bryn Mawr Hospital.

1892. BURR, CHARLES W., M.D., Clinical Professor of Nervous Diseases, Medico-Chirurgical College; Professor of Mental and Nervous Diseases, Philadelphia Polyclinic.

1886. CADWALADER, CHARLES E., M.D.

1895. CARPENTER, JOHN T., M.D., Adjunct Professor of Diseases of the Eye, Philadelphia Polyclinic; Assistant Surgeon to Wills Hospital; Ophthalmologist to the New Jersey Training School, Vineland, N. J.

1897. CARTER, WILLIAM S., M.D., Professor of Physiology in the University of Texas.

1892. CATTELL, HENRY W., M.D., Demonstrator of Morbid Anatomy in the University of Pennsylvania; Pathologist to the Presbyterian Hospital; Senior Physician to Coroner of Philadelphia.

*1892. CERNA, DAVID, M.D., Ph.D., Galveston, Texas; Demonstrator of Physiology in the Department of Medicine of the University of Texas; Corresponding Fellow of the Sociedad Española de Higiene of Madrid.

1885. CHAPIN, JOHN B., M.D., Physician to the Pennsylvania Hospital for the Insane.

1880. CHAPMAN, HENRY C., M.D., Professor of the Institutes of Medicine and of Medical Jurisprudence in Jefferson Medical College.

1868. CHESTNUT, J. H. W., M.D., Visiting Physician to the Penn Widows' Asylum.

1868. CHESTON, D. MURRAY, M.D.

1897. CHESTON, RADCLIFFE, M.D.

1873. CLARK, LEONARDO S., M.D.

1897. CLAXTON, CHARLES, M.D.

1872. CLEEMANN, RICHARD A., M.D.

1896. CLEVELAND, ARTHUR H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Surgeon-in-charge of Ear, Nose, and Throat Dispensary, Presbyterian Hospital.

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*1842. CLYMER, MEREDITH, M.D., New York.

1871. COHEN, J. SOLIS, M.D., Professor (Emeritus) of Diseases of the Throat and Chest in the Philadelphia Polyclinic; Professor (Honorary) of Laryngology in Jefferson Medical College; Consulting Physician to the Home for Consumptives, Phila.

1888. COHEN, SOLOMON SOLIS, M.D., Professor of Clinical Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer on Clinical Medicine in the Jefferson Medical College; Physician to the Philadelphia Hospital, to the Rush Hospital, and to the Polyclinic Hospital; Consulting Physician to the Jewish Hospital; Consulting Laryngologist to the Pennsylvania Training School for Feeble-minded Children.

1895. CROSS, WILLIAM A., M.D.

1866. CRUICE, R. B., M.D., Surgeon to St. Joseph's Hospital.

1884. CURTIN, ROLAND G., M.D., Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the University Hospital; Physician to the Philadelphia and Presbyterian Hospitals.

1884. DA COSTA, JOHN C., M.D., Gynecologist to Jefferson Medical College Hospital and to St. Agnes's Hospital.

1896. DA COSTA, JOHN CHALMERS, M.D., Surgeon to the Philadelphia Hospital; Demonstrator of Surgery in Jefferson Medical College; Chief Assistant Surgeon to the Hospital of Jefferson Medical College; Surgeon to Elwyn Institution for the Feeble-minded.

†1858. DA COSTA, J. M., M.D., LL.D., Professor (Emeritus) of the Principles and Practice of Medicine in Jefferson Medical College; Physician to the Pennsylvania Hospital; Consulting Physician to the Children's Hospital and to the Northern Dispensary.

1887. DALAND, JUDSON M.D., Instructor in Clinical Medicine and Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the Hospital of the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Director of the Stetson Laboratory of Hygiene.

1859. DARRACH, JAMES, M.D., Consulting Surgeon to the Germantown Hospital.

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1896. DAVIS, CHARLES N., M.D., Assistant Physician to the Dispensary for Diseases of the Skin, and Assistant Surgeon in the Dispensary for Genito-urinary Diseases in the Hospital of the University of Pennsylvania; Physician to the Department for Skin Diseases, Northern Dispensary.

1888. DAVIS, EDWARD P., M.D., Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic; Clinical Professor of Obstetrics in the Jefferson Medical College; Clinical Professor of Pædiatrics in the Woman's Medical College; Visiting Obstetrician to the Philadelphia Hospital; Physician to the Children's Department of the Howard Hospital; Member of the American Gynecological Society and of the American Pædiatric Society.

1889. DAVIS, GWILYM G., M.D., M.R.C.S. Eng., Surgeon to the Episcopal and St. Joseph's Hospitals; Surgeon to the Orthopædic Hospital; Assistant Demonstrator of Surgery in the University of Pennsylvania.

1874. DEAKYNE, A. C., M.D.

1894. DEAVER, HENRY C., M.D., Surgeon to the Episcopal and St. Mary's Hospitals and to St. Christopher's Hospital for Children.

1887. DEAVER, JOHN B., M.D., Assistant Professor of Applied Anatomy in the University of Pennsylvania; Attending Surgeon to the German and Philadelphia Hospitals; Consulting Surgeon to St. Agnes's, Germantown, and St. Timothy's Hospitals.

1892. DEAVER, RICHARD WILMOT, M.D.

1885. DERCUM, FRANCIS X., M.D., Clinical Professor of Neurology in Jefferson Medical College; Neurologist to the Philadelphia Hospital.

1891. DIXON, SAMUEL G., M.D., President and Executive Curator of the Academy of Natural Sciences of Philadelphia; Director of the Philadelphia Zoölogical Society; Manager of the Ludwick Institution.

1891. DIXON, WILLIAM C., M.D., Physician to the Industrial Home for Blind Women, Philadelphia; Physician to the Shelter for Colored Orphans, Philadelphia; Member of Consulting Staff, Philadelphia Home for Incurables; Examiner of Insane Patients, Philadelphia Hospital.

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1896. DONNELLAN, P. S., M.D., L.R.C.P. and S., Ireland; Lecturer on Physical Diagnosis in the Medico-Chirurgical College of Philadelphia; Visiting Physician to St. Mary's Hospital; Clinical Assistant, Throat Department, Philadelphia Polyclinic; Medical Examiner, Mutual Life Insurance Company of New York.

1897. DORLAND, W. A. NEWMAN, M.D., Instructor in Gynecology, Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Demonstrator of Obstetrics, University of Pennsylvania.

1893. DOWNS, NORTON, M.D.

1864. DOWNS, R. N., M.D.

1884. DRYSDALE, T. M., M.D.

1864. DUER, EDWARD L., M.D., Accoucheur to the Philadelphia Hospital; Surgeon to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1897. DUER, S. NAUDAIN, M.D., Physician to the Dispensary of the Presbyterian Hospital; Chief of Clinic for Diseases of the Chest at the Philadelphia Polyclinic and College for Graduates in Medicine.

1871. DUHRING, L. A., M.D., Professor of Skin Diseases in the University of Pennsylvania.

1881. DULLES, CHARLES WINSLOW, M.D., Lecturer on the History of Medicine, University of Pennsylvania; Surgeon to Rush Hospital; Surgeon in the Gynecological Dispensary, Presbyterian Hospital.

1863. DUNGLISON, RICHARD J., M.D.

*1871. DUNGLISON, THOMAS R., M.D., Paris, France.

1888. DUNN, THOMAS D., M.D.

*1849. DUNOTT, JUSTUS, M.D., Harrisburg, Pa.

1860. DUNTON, WILLIAM R., M.D., Consulting Physician to the Germantown Hospital.

*1882. EDWARDS, JOSEPH F., M.D., Atlantic City, N. J.

*1887. EDWARDS, WILLIAM A., M.D., San Diego, California.

1896. ELY, THOMAS C., M.D.

1893. ESHNER, AUGUSTUS A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to the Philadelphia Hospital.

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ELECTED

*1880. Eskridge, J. T., M.D., Denver, Colorado.

1868. Evans, Horace Y., M.D., Physician to the Charity Hospital.

1894. Faries, Randolph, M.D., Surgeon to the Orthopædic Dispensary of the Hospital of the University of Pennsylvania; Director of Physical Education, University of Pennsylvania and Protestant Episcopal Academy, Philadelphia.

1893. Farr, William W., M.D., Surgeon to the Dispensary of the Episcopal Hospital; Visiting Physician to the Sheltering Arms and to the Church Home for Children.

1884. Fenton, Thomas H., M.D., Medical Director and Senior Ophthalmologist of the Union Mission Hospital; Ophthalmologist to St. Vincent's Home and to the Home for Aged Couples.

1866. Fischer, Emil, M.D.

1884. Fisher, Henry M., M.D., Physician to the Episcopal Hospital; Microscopist to the Pennsylvania Hospital and Physician to the Out-patient Department of the same.

1888. Flick, Lawrence F., M.D.

1862. Forbes, William S., M.D., Professor of Anatomy in Jefferson Medical College.

†1885. Fox, Joseph M., M.D., Leesburg, Va.

1897. Frazier, Charles H., M.D., Surgeon to the Howard Hospital; Assistant Surgeon to the Home for Crippled Children; Surgeon-in-chief to the Surgical Dispensary, University of Pennsylvania; Surgeon to the Dispensary of the Episcopal Hospital; Assistant Instructor of Clinical Surgery, University of Pennsylvania.

1890. Freeman, Walter J., M.D., Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Out-patient Department of the Children's Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb.

1885. Fricke, Albert, M.D.

1893. Friebis, George, M.D., Ophthalmic Surgeon to the Mary Drexel Home and to the German Hospital.

1889. Fussell, M. Howard, M.D., Chief Physician to the Medical Dispensary of the Hospital of the University of Pennsylvania; Instructor in Clinical Medicine in the University of Pennsylvania.

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1873. GERHARD, GEORGE S., M.D.

1864. GETCHELL, F. H., M.D.

1892. GIBB, JOSEPH S., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Surgeon to the Ear, Nose, and Throat Department of the Episcopal Hospital.

1897. GIRVIN, JOHN H., M.D., Instructor in Gynecology and Assistant Demonstrator of Obstetrics at the University of Pennsylvania; Surgeon in the Dispensary for Diseases of Women at the University Hospital and at the Presbyterian Hospital.

1885. GIRVIN, ROBERT M., M.D., Gynecologist to the Presbyterian Hospital.

1889. GITHENS, WILLIAM H. H., M.D., Visiting Physician to the Sheltering Arms.

1894. GLEASON, E. BALDWIN, M.D., Clinical Professor of Otology in the Medico-Chirurgical College; Surgeon-in-charge of the Nose, Throat, and Ear Department, Northern Dispensary.

*1893. GOBRECHT, WILLIAM, M.D., Washington, D. C.

1884. GODEY, HARRY, M.D.

1893. GOODELL, W. CONSTANTINE, M.D., Clinical Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist, University Hospital.

1897. GOULD, GEORGE M., M.D.

1894. GRAHAM, EDWIN E., M.D., Clinical Professor of Diseases of Children in the Jefferson Medical College; Physician to the Franklin Reformatory Home.

1885. GRAHAM, JOHN, M.D.

1891. GREEN, WALTER D., A.M., M.D., Out-patient Surgeon to the Pennsylvania, Children's, and Methodist Hospitals; Assistant Surgeon to the Gynecean Hospital.

1870. GRIER, M. J., M.D.

1883. GRIFFITH, J. P. CROZER, M.D., Clinical Professor of the Diseases of Children in the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to St. Agnes's, the Children's, the Howard, the Methodist, and the Rush Hospitals.

1871. GROVE, JOHN H., M.D., Surgeon to St. Mary's and St. Agnes's Hospitals.

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1889. GUITÉRAS, JOHN, M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania.

*1893. HAMILL, ROBERT H., M.D., Summit, N. J.

1894. HAMILL, SAMUEL McC., Associate in Clinical Medicine in the William Pepper Laboratory of Clinical Medicine; Instructor in Clinical Medicine in the University of Pennsylvania; Physician to St. Christopher's Hospital for Children.

*1859. HAMMOND, WILLIAM A., M.D., Surgeon-General U. S. A. (Retired), Washington, D. C.

1897. HAND, ALFRED, JR., M.D., Physician to the Out-patient Department of the German, Methodist, and Children's Hospitals; Pathologist to the Children's Hospital; Assistant Demonstrator of Pathological Histology, Univ. of Penna.

1886. HANSELL, HOWARD F., M.D., Clinical Professor of Ophthalmology, Jefferson Medical College; Professor of Diseases of the Eye, Philadelphia Polyclinic; Consulting Ophthalmologist, Chester County Hospital; Ophthalmologist, Frederick Douglass Memorial Hospital.

1889. HARE, HOBART A., M.D., Professor of Therapeutics in Jefferson Medical College; Physician to St. Agnes's Hospital and to Jefferson Medical College Hospital.

1865. HARLAN, GEORGE C., M.D., Surgeon to Wills Eye Hospital and to the Eye and Ear Department of the Pennsylvania Hospital; Professor (Emeritus) of Diseases of the Eye in the Philadelphia Polyclinic.

1862. HARRIS, ROBERT P., M.D.

1885. HARTE, RICHARD H., M.D., Surgeon to Pennsylvania Hospital; Surgeon to Episcopal Hospital; Surgeon to St. Mary's Hospital; Consulting Surgeon to St. Timothy's Hospital; Demonstrator of Osteology, University of Pennsylvania.

1888. HARTZELL, MILTON B., M.D., Instructor in Dermatology, University of Pennsylvania; Dermatologist to the Methodist Episcopal Hospital.

1872. HAYS, I. MINIS, M.D.

1882. HEARN, W. JOSEPH, M.D., Surgeon to the Hospital of Jefferson Medical College and to the Philadelphia Hospital.

1884. HENRY, FREDERICK P., M.D., Physician to the Philadelphia Hospital; Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania.

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ELECTED

1891. HEWSON, ADDINELL, A.M., M.D., Demonstrator of Anatomy in Jefferson Medical College; Dispensary Surgeon to the Hospital of the Protestant Episcopal Church.

1872. HINKLE, A. G. B., M.D.

1897. HINKLE, WILLIAM M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory.

1892. HINSDALE, GUY, M.D., Physician to the Presbyterian Orphanage and to the Out-patient Department of the Presbyterian Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases.

1888. HIRSH, ABRAM B., M.D., Physician to Charity Hospital.

1888. HIRST, BARTON COOKE, M.D., Professor of Obstetrics in the University of Pennsylvania; Obstetrician to the Philadelphia Hospital and to the Maternity Hospital.

1894. HOCH, WILLIAM R., M.D., Instructor in Laryngology, University of Pennsylvania; Laryngologist to Rush Hospital, and to the Methodist Episcopal Hospital.

1885. HOLLAND, JAMES W., M.D., Professor of Medical Chemistry and Toxicology in Jefferson Medical College.

†1879. HOPKINS, WILLIAM BARTON, M.D., Surgeon to the Pennsylvania Hospital.

1888. HORWITZ, ORVILLE, M.D., Clinical Professor of Genito-urinary Diseases in Jefferson Medical College; Surgeon to the Philadelphia Hospital.

1868. HOWELL, SAMUEL B., M.D., Professor of Chemistry in the Medico-Chirurgical College.

1892. HUGHES, WILLIAM E., M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Visiting Physician to the Philadelphia and Medico-Chirurgical Hospitals; Pathologist to the Presbyterian Hospital.

1871. INGHAM, JAMES V., M.D.

1885. JACKSON, EDWARD, M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic; Surgeon to Wills Eye Hospital.

1887. JAYNE, HORACE, M.D., Professor of Vertebrate Morphology in the Biological Department of the University of Pennsylvania.

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ELECTED

1885. JUDD, LEONARDO DA VINCI, M.D.

1867. JUDSON, OLIVER A., M.D.

1886. JURIST, LOUIS, M.D., Chief Clinical Assistant in the Laryngological Department of Jefferson Medical College Hospital.

†1867. KEEN, WILLIAM W., M.D., LL.D., Professor of the Principles of Surgery and of Clinical Surgery in Jefferson Medical College; Surgeon to Jefferson Medical College Hospital and to the Orthopædic Hospital and Infirmary for Nervous Diseases, and Consulting Surgeon to St. Agnes's Hospital and to the Woman's Hospital; Membre Correspondant Étranger de la Société de Chirurgie de Paris; Membre Honoraire de la Société Belge de Chirurgie.

1897. KELLY, ALOYSIUS O. J., M.D., Instructor of Physical Diagnosis, University of Pennsylvania; Adjunct Professor of Pathology, Director of the Neurological Laboratory, and Bacteriologist, Philadelphia Polyclinic and College for Graduates in Medicine; Visiting Physician to St. Mary's and St. Agnes's Hospitals; Pathologist to the German Hospital.

1887. KELLY, HOWARD A., M.D., Professor of Gynecology in the Johns Hopkins University, and Gynecologist and Obstetrician to the Hospital, Baltimore, Md.

1844. KING, CHARLES R., M.D., Andalusia, Pa.

1875. KIRKBRIDE, JOSEPH J., M.D.

1897. KNEASS, SAMUEL S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania.

1897. KYLE, D. BRADEN, M.D., Clinical Professor of Laryngology and Rhinology, Jefferson Medical College; Consulting Laryngologist, Rhinologist, and Otologist to St. Agnes's Hospital; Bacteriologist to the Orthopædic Hospital and Infirmary for Nervous Diseases; Pathologist to the Charity Hospital, and Visiting Physician to the Philadelphia Home for Incurables.

1892. LAINÉ, DAMASO T., M.D.

1865. LA ROCHE, C. PERCY, M.D., Rome, Italy.

1887. LEAMAN, HENRY, M.D.

1893. LECONTE, ROBERT G., M.D., Surgeon to the Methodist Episcopal Hospital and to the Out-patient Departments of the

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ELECTED

Pennsylvania Hospital and Children's Hospital; Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to the Gynecean Hospital.

1883. LEFFMANN, HENRY, M.D., Professor of Chemistry in the Philadelphia Polyclinic and in the Woman's Medical College; Pathological Chemist to Jefferson Medical College Hospital.

1892. LEIDY, JOSEPH, M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Training School for Feeble-minded Children.

1855. LEWIS, FRANCIS W., M.D.

1877. LEWIS, MORRIS J., M.D., Physician to the Children's Hospital, to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to the Pennsylvania Hospital.

1886. LLOYD, J. HENDRIE, M.D., Physician to the Nervous and Insane Department of the Philadelphia Hospital, to the Methodist Episcopal Hospital, and to the Home for Crippled Children.

1893. LONGAKER, DANIEL, M.D.

1877. LONGSTRETH, MORRIS, M.D., Professor of Pathological Anatomy in Jefferson Medical College; Physician to the Pennsylvania Hospital.

1886. MACCOY, ALEXANDER W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Lecturer on Diseases of the Throat and Nose in the Woman's Medical College of Pennsylvania.

1896. MAKUEN, G. HUDSON, M.D., Professor of Defects of Speech at the Philadelphia Polyclinic; Laryngologist to St. Mary's Hospital and to the Frederick Douglass Memorial Hospital; Visiting Consultant on Defects of Speech at the New Jersey Training School for Feeble-minded Children.

*1885. MALLET, JOHN W., M.D., Charlottesville, Va.

1893. MARSHALL, JOHN, M.D., Assistant Professor of Chemistry in the University of Pennsylvania.

1889. MARTIN, EDWARD, M.D., Surgeon to the Howard Hospital; Clinical Professor of Genito-urinary Diseases in the University of Pennsylvania.

1887. MASSEY, ISAAC, M.D., Surgeon to the Pennsylvania Railroad; Physician to the Chester County Hospital.

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ELECTED

1885. MAYS, THOMAS J., M.D., Professor of Diseases of the Chest and of Experimental Therapeutics in the Philadelphia Polyclinic; Visiting Physician to Rush Hospital.

1875. MCCLELLAN, GEORGE, M.D., Surgeon to the Howard Hospital.

1895. MCFARLAND, JOSEPH, M.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College; Pathologist to Rush Hospital.

1868. MEARS, J. EWING, M.D., Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery; Gynecologist to Jefferson Medical College Hospital; Surgeon to St. Agnes's Hospital.

1875. MEIGS, ARTHUR V., M.D., Physician to the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind.

*1884. MIFFLIN, HOUSTON, M.D., Columbia, Pa.

1894. MILLER, D. J. MILTON, M.D., Physician to the Episcopal Hospital; Assistant Physician to the Children's Hospital.

1881. MILLS, CHARLES K., M.D., Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic, and in the Woman's Medical College of Pennsylvania; Neurologist to the Philadelphia Hospital.

†1888. MITCHELL, JOHN K., M.D., Instructor in Clinical Medicine in the University of Pennsylvania; Physician to St. Agnes's Hospital; Assistant Physician to the University Hospital and to the Infirmary for Nervous Diseases.

1856. MITCHELL, S. WEIR, M.D., Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic; Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Physician to the Maternity Hospital.

1882. MONTGOMERY, EDWARD E., M.D., Clinical Professor of Gynecology in the Jefferson Medical College; Obstetrician to the Philadelphia Hospital.

1863. MOREHOUSE, GEORGE R., M.D., Ph.D.

1886. MORRIS, CASPAR, M.D., Physician to the Episcopal Hospital and to the Out-patient Department of the Penna. Hospital.

1893. MORRIS, ELLISTON J., M.D., Physician to the Dispensary of the Episcopal Hospital.

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ELECTED

1883. MORRIS, HENRY, M.D., Gynecologist to the Howard Hospital.

1856. MORRIS, J. CHESTON, M.D.

1897. MORTON, SAMUEL W., M.D., Instructor in Clinical Medicine, University of Pennsylvania; Medical Director of the Pennsylvania Epileptic Hospital and Colony Farm; Visiting Physician to the Philadelphia Home for Incurables, to the Masonic Home of Pennsylvania, and to the Hospital of the Pennsylvania Epileptic Hospital and Colony Farm.

1861. MORTON, THOMAS G., M.D., Surgeon to the Pennsylvania and the Orthopædic Hospitals; Consulting Surgeon to the Jewish Hospital; Emeritus Surgeon to Wills Eye Hospital.

1891. MORTON, T. S. K., M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Polyclinic Hospital; Assistant Surgeon to the Orthopædic Hospital; Surgeon to Out-patient Department of the Pennsylvania Hospital; Consulting Surgeon to the Philadelphia Dispensary.

1864. MOSS, WILLIAM, M.D.

1890. MÜLLER, AUGUSTE F., M.D., Attending Physician to the Germantown Hospital.

1882. MUSSER, JOHN H., M.D., Assistant Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital and to the Presbyterian Hospital; Consulting Physician to the Woman's Hospital of Philadelphia and to the West Philadelphia Hospital for Women.

1896. MYERS, T. D., M.D.

1886. NEFF, JOSEPH F., M.D.

1887. NEILSON, THOMAS RUNDLE, M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Professor of Genito-urinary Surgery in the Philadelphia Polyclinic; Assistant Demonstrator of Surgery in the University of Pennsylvania.

1889. NOBLE, CHARLES P., M.D., Surgeon-in-Chief to the Kensington Hospital for Women; Surgeon-in-Charge of the Department for Women of the Northern Dispensary; Surgeon-in-Charge of the Department for Women of the Union Dispensary; Lecturer on Gynecology in the Philadelphia Polyclinic.

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ELECTED

1893. NOBLE, WILLIAM H., M.D.

1869. NORRIS, HERBERT, M.D., Supervising Physician to St. Clement's Hospital.

1865. NORRIS, ISAAC, JR., M.D.

1892. NORRIS, RICHARD C., M.D., Lecturer on Clinical and Operative Obstetrics, University of Pennsylvania; Obstetrician-in-Charge, Preston Retreat; Visiting Obstetrician to the Philadelphia Hospital; Gynecologist to the Methodist Hospital; Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital.

1866. NORRIS, WILLIAM F., M.D., Professor of Ophthalmology and Clinical Professor of Diseases of the Eye in the University of Pennsylvania; Surgeon to Wills Eye Hospital.

1884. OLIVER, CHARLES A., M.D., Attending Surgeon to Wills Eye Hospital; Ophthalmic Surgeon to the Philadelphia and the Presbyterian Hospitals; Consulting Ophthalmic Surgeon to St. Agnes's, St. Timothy's, and Maternity Hospitals; Consulting Ophthalmologist to the State Hospital for the Chronic Insane of Pennsylvania.

1884. O'NEILL, J. W., M.D.

1885. OSLER, WILLIAM, M.D., Professor of Medicine in Johns Hopkins University, and Physician to the Hospital, Baltimore, Md.

1897. PACKARD, FRANCIS R., M.D., Physician to the Ear, Nose, and Throat Department of St. Christopher's Hospital for Children; Assistant in the Clinic for Diseases of the Ear at the Polyclinic Hospital; Assistant Physician in the Dispensary for Diseases of the Nose and Throat in the Hospital of the University of Pennsylvania.

1890. PACKARD, FREDERICK A., M.D., Visiting Physician to the Philadelphia and Children's Hospitals; Physician to the Out-patient Department of the Pennsylvania Hospital; Instructor in Physical Diagnosis in the University of Pennsylvania.

1858. PACKARD, JOHN H., M.D., Late Surgeon to the Pennsylvania Hospital; Surgeon to St. Joseph's Hospital.

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ELECTED

1882. PARISH, WILLIAM H., M.D., Professor of Obstetrics in the Dartmouth Medical College; Professor of Anatomy in the Woman's Medical College of Pennsylvania; Consulting Obstetrician to the Lying-in Charity; Consulting Surgeon to the Kensington Hospital; Consulting Gynecologist to St. Agnes's Hospital.

1883. PARVIN, THEOPHILUS, M.D., Professor of Obstetrics and Diseases of Women and Children in the Jefferson Medical College.

1896. PEARCE, F. SAVARY, M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Chief of the Medical Dispensary of St. Agnes's Hospital.

†1889. PENROSE, CHARLES BINGHAM, M.D., Professor of Gynecology in the University of Pennsylvania; Surgeon to the Gynecean Hospital.

1854. PENROSE, R. A. F., M.D., LL.D., Professor (Emeritus) of Obstetrics and Diseases of Women and Children in the University of Pennsylvania; Consulting Obstetrician to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1868. PEPPER, WILLIAM, M.D., LL.D., Professor of the Theory and Practice of Medicine in the University of Pennsylvania.

1884. PERKINS, FRANCIS M., M.D., Ophthalmic Surgeon to St. Agnes's Hospital; Ophthalmic Surgeon to the Presbyterian Hospital.

1890. PHILLIPS, J. WILLOUGHBY, M.D.

1883. PIERSOL, GEORGE A., M.D., Professor of Anatomy in the University of Pennsylvania.

1872. PORTER, WILLIAM G., M.D., Surgeon to the Presbyterian Hospital and to the Philadelphia Hospital.

1896. POSEY, W. CAMPBELL, M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to the Howard and Epileptic Hospitals, and to the Home for Incurables; Consulting Ophthalmologist to the State Hospital for the Insane at Norristown.

1885. POTTER, THOMAS C., M.D.

1887. PRICE, JACOB, M.D.

†1889. PRICE, JOSEPH, M.D., Obstetric Physician to the Philadelphia Dispensary.

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ELECTED

1889. Randall, B. Alexander, M.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania and Professor of Diseases of the Ear in the Philadelphia Polyclinic; Ophthalmic and Aural Surgeon to the Children's Hospital; Otologist to Rush Hospital.

1887. Reed, Charles H., M.D.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania.

1897. Rhein, John H. W., M.D., Medical Electrician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children; Instructor in Neuro-pathology, Philadelphia Polyclinic and College for Graduates in Medicine; Chief of Clinic for Nervous Diseases, St. Agnes's Hospital.

1891. Rhoads, Edward G., M.D.

1895. Ring, Gassaway Oram, M.D., Ophthalmic Surgeon to the Episcopal Hospital, and Ophthalmic and Aural Surgeon to the Samaritan Hospital, Philadelphia.

1891. Risley, S. D., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Attending Surgeon at the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine.

†1878. Roberts, John B., M.D., Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Methodist Hospital.

1888. Robins, Robert P., M.D., Visiting Surgeon to the Dispensary of the House of Industry, to the Church Home for Children, and to the Board of Guardians of the Poor; Lecturer on Chemistry in the Episcopal Academy.

1897. Sailer, Joseph, M.D., Associate in the Pepper Clinical Laboratory, University of Pennsylvania; Pathologist to the Institution for Feeble-minded Children.

†1866. Schaffer, Charles, M.D., Professor of Botany in the Pennsylvania Horticultural Society.

1887. De Schweinitz, George E., M.D., Clinical Professor of Ophthalmology in the Jefferson Medical College; Professor of Ophthalmology in the Philadelphia Polyclinic; Ophthalmic

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ELECTED

and Aural Surgeon to the Children's Hospital; Ophthalmologist to the Orthopædic Hospital and to the Philadelphia Hospital; Consulting Ophthalmic Surgeon to the Methodist Episcopal Hospital.

1885. Scott, J. Alison, M.D., Demonstrator of Physical Diagnosis in the University of Pennsylvania; Physician to Out-patient Department, Pennsylvania Hospital; Physician to the Church Home; Assistant Medical Director of Penn Mutual Life Insurance Company.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic.

1888. Seltzer, Charles M., M.D.

1875. Seyfert, Theodore H., M.D.

1884. Shaffner, Charles, M.D., Ophthalmic Surgeon to the Presbyterian Hospital.

1887. Shakespeare, Edward O., M.D.

1897. Sharpless, W. T., M.D., Physician to the Chester County Hospital, West Chester, Pa.

1876. Shippen, Edward, A.M., M.D., U. S. Navy (retired).

1891. Shober, John B., M.D., Gynecologist to the Philadelphia Hospital and to the Howard Hospital; Assistant Gynecologist to the Gynecean Hospital.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Methodist Hospital.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms, Southern Home for Destitute Children, and Pennsylvania Epileptic Hospital; Physician to Out-patient Department of the German, Episcopal, and Children's Hospitals.

1896. Shoemaker, William T., M.D., Surgeon to the Eye Dispensary of the German Hospital; Ophthalmologist to the Southern Home for Destitute Children.

1880. Simes, J. H. C., M.D., Emeritus Professor of Genito-urinary and Venereal Diseases in the Philadelphia Polyclinic.

1873. Simpson, James, M.D.

1872. Sinkler, Wharton, M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Neurologist to the Philadelphia Hospital; Physician to the Epileptic Hospital of Philadelphia.

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ELECTED

1895. Slocum, Harris A., M.D., Gynecologist to St. Clement's Hospital for Epileptics; Professor of Gynecology in the Philadelphia Polyclinic.

*1863. Smith, A. K., M.D., U. S. A. (retired), New Hartford, Conn.

*1864. Smith, Edward A., M.D., New York.

1896. Smith, Lawrence S., M.D., Instructor in Clinical Gynecology in the University of Pennsylvania; Chief Surgeon to the Dispensary for Diseases of Women in the Hospital of the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital; Visiting Obstetrician to the Maternity Hospital; Surgeon 1st Regiment Infantry, N. G. P.

1895. Spellissy, Joseph M., M.D., Visiting Surgeon to St. Mary's Hospital; Out-patient Surgeon to the Pennsylvania, Methodist, and St. Agnes's Hospitals, and Assistant Surgeon to the Orthopædic Dispensary of the University Hospital.

1897. Spiller, William G., M.D., Professor of Diseases of the Nervous System in the Philadelphia Polyclinic and College for Graduates in Medicine; Associate in the William Pepper Clinical Laboratory, University of Pennsylvania; Neurologist to the New Jersey Training School for Feeble-minded Children; Pathologist to the Pennsylvania Training School for Feeble-minded Children; Pathologist to the Pennsylvania Epileptic Hospital and Colony Farm.

1894. Stahl, B. Franklin, Ph.G., B.S, M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Visiting Physician to St. Agnes's Hospital; Ophthalmic Surgeon to Charity Hospital.

1875. Starr, Louis, M.D.

1892. Steinbach, Lewis W., M.D., Professor of Clinical and Operative Surgery in the Philadelphia Polyclinic; Visiting Surgeon to the Philadelphia Hospital and to the Jewish Hospital of Philadelphia.

1884. Stelwagon, Henry W., M.D., Ph.D., Clinical Professor of Dermatology in Jefferson Medical College; Dermatologist to the Philadelphia Hospital; Physician to the Department for Skin Diseases of the Howard Hospital and the Northern Dispensary; Clinical Professor of Dermatology in the Woman's Medical College.

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ELECTED

1895. STENGEL, ALFRED, M.D., Instructor in Clinical Medicine, University of Pennsylvania; Assistant Physician, University Hospital; Professor of Clinical Medicine, Woman's Medical College; Physician to Howard, Philadelphia, and Children's Hospitals; Pathologist to German Hospital.

1888. STEWART, DAVID D., M.D., Professor of Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Attending Physician to the Episcopal Hospital.

†1842. STILLÉ, ALFRED, M.D., LL.D., Professor (Emeritus) of the Theory and Practice of Medicine in the University of Pennsylvania; Consulting Physician to the Maternity Hospital, to the Woman's Hospital, and to Rush Hospital.

1884. STRYKER, SAMUEL S., M.D., Physician to the Presbyterian Hospital.

1886. TAYLOR, JOHN MADISON, M.D., Neurologist to Howard Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Physician to the Children's Hospital; Professor of Children's Diseases in the Philadelphia Polyclinic; Fellow of the American Academy of Medicine.

1887. TAYLOR, WILLIAM J., M.D., Surgeon to St. Agnes's Hospital, and Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases.

1886. TAYLOR, WILLIAM L., M.D., Instructor in Clinical Gynecology in the University of Pennsylvania, and Chief of the Clinic and Assistant Gynecologist to the Hospital of the same; Surgeon-in-Chief to the Beacon Service for Women.

1867. THOMAS, CHARLES HERMON, M.D.

1897. THOMSON, A. G., M.D., Ophthalmic Surgeon to the Children's Hospital; Assistant Ophthalmic Surgeon to Wills Eye Hospital; Assistant Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases; Ophthalmologist to Bethany Dispensary; Demonstrator of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine.

†1869. THOMSON, WILLIAM, M.D., Emeritus Professor of Ophthalmology in the Jefferson Medical College, and Ophthalmic

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ELECTED

Surgeon to the Hospital of the same; Emeritus Surgeon to Wills Eye Hospital.

1896. THORINGTON, JAMES, M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic; Assistant Ophthalmologist, Wills Eye Hospital; Ophthalmologist to the Methodist Orphanage; Ophthalmologist to the Vineland Training School for Feeble-minded Children.

1896. TOULMIN, HENRY, M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Obstetrical Registrar, Philadelphia Hospital; Attending Physician to the Philadelphia Home for Incurables; Attending Physician to the Church Home, Angora.

1894. TUNIS, JOSEPH PRICE, M.D., Assistant Demonstrator of Anatomy and of Surgery in the University of Pennsylvania; Surgeon to the Methodist Hospital; Surgeon to the Dispensaries of the Presbyterian and Children's Hospitals.

1866. TYSON, JAMES, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Hospital of the University of Pennsylvania; Physician to the Philadelphia Hospital.

1897. TYSON, T. MELLOR, M.D., Assistant Physician to the Hospital of the University of Pennsylvania; Instructor in Clinical Medicine in the University of Pennsylvania; Assistant Physician in the Medical Dispensary of the University Hospital; Visiting Physician to the Rush Hospital for the Treatment of Consumption; one of the Physicians to the Philadelphia Lying-in Hospital.

1864. VANDYKE, E. B., M.D.

1873. VAN HARLINGEN, ARTHUR, M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Howard Hospital.

1893. VANSANT, EUGENE LARUE, M.D., Lecturer on Clinical Medicine in Jefferson Medical College; Visiting Physician to the Philadelphia Hospital.

1897. VEASEY, CLARENCE A., M.D., Adjunct Professor of Diseases of the Eye, Philadelphia Polyclinic and College for Graduates in Medicine; Demonstrator of Ophthalmology, Jefferson Medical College; Chief Clinical Assistant to the Ophthal-

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ELECTED

mological Department, Jefferson Medical College Hospital; Consulting Ophthalmologist Philadelphia Lying-in Charity.

1883. VINTON, CHARLES HARROD, M.D.

1885. WALKER, JAMES B., M.D., Attending Physician to the Philadelphia Hospital; Lecturer on Clinical Medicine and Consulting Physician to the Woman's Hospital.

1893. WARREN, JOSEPH W., M.D., Associate Professor of Physiology in Bryn Mawr College.

1895. WATSON, ARTHUR W., M.D.

1886. WATSON, E. W., M.D., Physician to the Pennsylvania Institution for the Blind; Visiting Physician to the Home for Consumptives.

1875. WEBB, WILLIAM H., M.D.

1883. WELCH, WILLIAM M., M.D., Physician-in-Charge of the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary; Consulting Physician to the Northern Home for Friendless Children.

1897. WELLS, WILLIAM H., M.D., Adjunct Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic.

1893. WESTCOTT, THOMPSON S., M.D., Instructor in Diseases of Children in the University of Pennsylvania; Visiting Physician to the Methodist Episcopal Hospital; Assistant Physician to the Children's Hospital.

1884. WHARTON, HENRY R., M.D., Demonstrator of Surgery in the University of Pennsylvania, and Assistant Surgeon to the Hospital of the University of Pennsylvania; Surgeon to the Children's, Presbyterian, and Methodist Episcopal Hospitals.

1883. WHELEN, ALFRED, M.D.

1878. WHITE, J. WILLIAM, M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Maternity Hospital.

†1880. WILLARD, DE FOREST, M.D., Clinical Professor of Orthopædic Surgery in the University of Pennsylvania; Surgeon to the Presbyterian Hospital; Consulting Surgeon to the White and to the Colored Cripples' Homes and to the Home for Incurables.

*1878. WILLIAMSON, JESSE, M.D., Visiting Surgeon, St. Francis's Hos-

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ELECTED

pital, Colorado Springs, Colorado; Surgeon of Colorado-Philadelphia Reduction Co.; Consulting Surgeon to Denver, Texas, and Gulf R. R.

1881. Wilson, H. Augustus, M.D., Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Jefferson Medical College; Consulting Orthopædic Surgeon to the Philadelphia Lying-in Charity and to the Kensington Hospital for Women.

1874. Wilson, James C., M.D., Professor of the Practice of Medicine and of Clinical Medicine in Jefferson Medical College, and Physician to the Hospital of the same (Faculty Staff); Physician to the German Hospital; Attending Physician, Pennsylvania Hospital; President of the Philadelphia County Medical Society.

1897. Wilson, W. Reynolds, M.D., Visiting Physician to the Philadelphia Lying-in Charity Hospital.

1884. Wirgman, Charles, M.D., Physician to the Hospital of Jefferson Medical College and to the Howard Hospital; Physician to Out-patient Department of Children's Hospital.

1893. Wolff, Lawrence, M.D., Demonstrator of Chemistry in the Jefferson Medical College; Visiting Physician to the German Hospital; Clinical Professor of Medicine in the Woman's Medical College.

1893. Wood, Alfred C., M.D., Instructor in Clinical Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Surgeon to the Philadelphia Hospital.

1865. Wood, Horatio C., M.D., Professor of Materia Medica, Pharmacy, and General Therapeutics in the University of Pennsylvania, and Clinical Professor of Diseases of the Nervous System in the Hospital of the same.

1880. Woodbury, Frank, M.D., Honorary Professor of Clinical Medicine in the Medico-Chirurgical College, and Physician to the Hospital of the same.

1866. Woods, D. F., M.D., Physician to the Presbyterian Hospital.

1888. Woodward, Charles E., M.D., Physician to the Chester County Prison and West Chester Board of Health; U. S. Examining Surgeon.

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ELECTED

1897. WOODWARD, GEORGE, M.D.,, Associate in Clinical Medicine, University of Pennsylvania.

1860. WURTS, CHARLES STEWART, M.D., Physician to Foster Home.

1868. YARROW, THOMAS J., M.D.

1889. YOUNG, JAMES K., M.D., Instructor in Orthopædic Surgery, University of Pennsylvania, and Assistant Orthopædic Surgeon to the University Hospital; Professor of Orthopædic Surgery, Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Home for Crippled Children.

1894. ZENTMAYER, WILLIAM, M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to St. Mary's Hospital, Philadelphia, and to the Stratford Castle Hospital, Phœnixville, Pa.

1887. ZIEGLER, WALTER M. L., M.D., Assistant Aural Surgeon and Chief of the Dispensary for Diseases of the Ear in the Hospital of the University of Pennsylvania.

1895. ZIMMERMAN, MASON W., M.D., Ophthalmic Surgeon to the Germantown Hospital.

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ASSOCIATE FELLOWS.

[Limited to Fifty, of whom Twenty may be Foreigners.]

ELECTED

1873. Acland, Henry W., M.D., F.R.S., Oxford, England.
1890. Baccelli, Guido, Rome, Italy.
1877. Barnes, Robert, M.D., London, England.
1876. Billings, John S., M.D., U. S. A., Washington, D. C.
1886. Bowditch, Henry P., M.D., Boston, Massachusetts.
1894. Brunton, T. Lauder, M.D., London, England.
1877. Chaillé, Stanford E., M.D., New Orleans, Louisiana.
1886. Cheever, David W., M.D., Boston, Massachusetts.
1896. Conner, Phineas Sanborn, M.D., Cincinnati, Ohio.
1893. Councilman, William T., M.D., Boston, Massachusetts.
1876. Davis, N. S., M.D., Chicago, Illinois.
1886. Draper, William H., M.D., New York.
1892. Emmet, Thomas Addis, M.D., New York.
1883. Fayrer, Sir Joseph, M.D., LL.D., F.R.S., London, England.
1892. Fitz, Reginald H., M.D., Boston, Massachusetts.
1896. Fletcher, Robert, M.D., Washington, D. C.
1883. Heath, Christopher, F.R.C.S., London, England.
1896. Jaccoud, Prof. S., M.D., Paris, France.
1874. Jackson, J. Hughlings, M.D., London, England.
1891. Jacobi, A., M.D., New York.
1893. v. Jaksch, Rudolf, M.D., Prague, Bohemia.
1876. Johnson, Sir George, M.D., F.R.S., London, England.
1893. Kerr, John G., M.D., Canton, China.
1896. Leyden, Dr. Ernst, Berlin, Germany.
1877. Lister, Sir Joseph, Bart., M.D., LL.D., F.R.S., London, England.
1895. McBurney, Charles, M.D., New York.

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ELECTED

1886. McGuire, Hunter, M.D., Richmond, Virginia.
1876. Moore, E. M., M.D., Rochester, New York.
1873. Ogle, John W., M.D., London, England.
1874. Paget, Sir James, Bart., M.D., LL.D., F.R.S., D.C.L., London, England.
1876. Pollock, A. M., M.D., Pittsburg, Pennsylvania.
1886. Reeve, John C., M.D., Dayton, Ohio.
1886. Senn, Nicholas, M.D., Milwaukee, Wisconsin.
1896. Pye-Smith, P. H., M.D., London, England.
1896. Sternberg, George M., M.D., U. S. A., Washington, D. C.
1896. Stewart, Sir T. Grainger, Bart., M.D., Edinburgh, Scotland.
1886. Thomas, T. Gaillard, M.D., New York.
1896. Tiffany, L. McLane, M.D., Baltimore, Maryland.
1869. Valcourt, Th. de, M.D., Cannes, France.
1892. Virchow, Rudolf, M.D., Berlin, Germany.
1894. Warren, J. Collins, M.D., Boston, Massachusetts.
1894. Weir, Robert F., M.D., New York.
1892. Welch, William H., M.D., Baltimore, Maryland.
1886. Whittaker, James T., M.D., Cincinnati, Ohio.
1886. Yandell, David W., M.D., Louisville, Kentucky.

CORRESPONDING MEMBERS.

ELECTED

1880. Carrow, Flemming, M.D., United States.
1880. Chiara, Domenico, M.D., Florence, Italy.
1886. Dey, Kanny Lall, M.D., Calcutta, India.
1885. Rendu, Jean, M.D., Lyons, France.

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NECROLOGICAL LIST

FELLOWS

THEODORE G. WORMLEY,	January 3, 1897
WILLIAM H. PANCOAST,	January 5, 1897
WILLIAM A. CAREY,	January 29, 1897
HENRY HARTSHORNE,	February 10, 1897
ANTHONY E. STOCKER,	May 23, 1897
WILLIAM H. FORD,	October 18, 1897
HARRISON ALLEN,	November 14, 1897
GEORGE H. HORN,	November 24, 1897

ASSOCIATE FELLOWS

TRAILL GREEN,	April 26, 1897
WILLIAM T. LUSK,	June 12, 1897

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MEMOIR OF H. ERNEST GOODMAN, M.D.

By J. M. ANDERS, M.D.

[Read January 6, 1897.]

The task of recording a just tribute to the memory of the faithful, modest, and eminent member of our profession—the late Dr. Henry Ernest Goodman—and of presenting a summary of his useful career has been performed. This, however, has not been done without anxiety, which sprang from a feeling of incapacity to accomplish the task as befits the subject of this memoir, as well as this occasion. Although I had been acquainted with him previously, it was my privilege to enjoy his more intimate friendship and society for a period of several years while associated as fellow-members of the same faculty. Thus I was afforded ample opportunity to observe those personal characteristics which so tenderly endeared him to his professional colleagues and patients, and so uniformly excited a strong, deep, but gentle sympathy in his numerous associates, and to note and appreciate his true worth as a teacher of surgery and practitioner of medicine. It is upon his professional life and personal characteristics that I purpose to dwell chiefly, making brief reference only to his very notable public and military career.

Dr. Henry Ernest Goodman was born at Speedwell, near Philadelphia, on April 12, 1836. He was of German descent and the grandson of an officer in the Continental Army. His professional training was received in the University of Pennsylvania, whence he was graduated in 1859. After graduation he was chosen and served as resident physician in the Phila-

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delphia Hospital. Soon after the expiration of his term he was elected to a similar position at the Wills Eye Hospital, where he found abundant opportunity to prosecute the study of diseases of the eye, a branch of medicine for which he thus early manifested a strong predilection. On completing his term as *interne* in this hospital, Dr. Goodman, who was now more than ordinarily equipped to enter upon the duties of his profession, settled in Philadelphia with a view to following general medical practice, but giving special attention to ophthalmic and orthopædic surgery. In this undertaking he received immediate encouragement, and soon generous public support.

His name will long be connected with the Orthopædic Hospital of Philadelphia, of which he was one of the founders. He held the post of surgeon to this hospital from the time of its organization down to the time of his untimely death; and for twenty years, also, that of attending surgeon to the Wills Eye Hospital. The statement may safely be ventured that these noble and well-known charities never had a more interested, devoted, and helpful friend than the late Dr. Goodman. Of his valuable time he gave the best hours of each day to arduous work in their service. Dr. Goodman was also one of the originators of the Pennsylvania State Hospital for Women. In 1885 he became connected with the Medico-Chirurgical Hospital, then a young and struggling institution, and here his timely advice and persistent personal efforts as a member of its surgical and administrative staffs soon made his genius felt. The friends of the several hospitals of Philadelphia with which Dr. Goodman was long and closely identified cannot fail to make grateful acknowledgment of his unselfish, gratuitous, and extensive labors in their behalf. As a promoter of charitable institutions, as well as an ardent member of their surgical staffs, Dr. Goodman, during life, achieved a high reputation; and if we were to pause long enough to bring together, now that his labors have ceased forever, the important *rôles* which he played in the work and successful conduct of the different hospitals, before referred to, that reputation would, I confidently believe, be extended.

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He was Port Physician of Philadelphia from 1866 to 1872, and Examining Surgeon of the United States Pension Bureau from 1866 to 1884. In 1885 he was made Professor of Surgery at the Medico-Chirurgical College—a position which he filled most worthily and acceptably for six years. His lectures were noteworthy for their perspicuity as well as for the safety and soundness of their substance. As a teacher he was concise, yet expressed fully enough the truths he wished to impart, while his sympathetic nature and warmth of manner quickly led to the establishment of pleasant personal relations between himself and his students. For the latter he manifested a tender feeling at all times, and I am not expressing a syllable more than I believe when I say: No man ever enjoyed to a greater degree than he the respect and affectionate regard of medical students. On being requested to give the reason for his unrivaled popularity among students and recent graduates, he replied in the hearing of the writer, that it must be due to a natural and mutual attraction—apparently unconscious of his own personal charm of manner, his kindness, sincerity, and devotion to his pupils. But to the candid critic these merits, than which there could be none more worthy, indicate the noble characteristics that won their way to the hearts of his students, patients, and friends alike.

His own resources in the line of practical surgical knowledge, upon which he drew constantly, were extraordinary. This fact could not be appreciated except by those who attended his clinics and listened to his *viva voce* expositions of practical surgery, for Dr. Goodman furnished but few detached contributions to surgical literature. At the time of his death he held the emeritus professorship of surgery in the Medico-Chirurgical College. He kept fully abreast with the times through books and current literature, but chiefly by surrounding himself with young, talented, and ambitious workers in the profession. Dr. Goodman was one of the few remaining general surgeons who specially devoted themselves to ophthalmology, and, while practicing this particular branch of surgery successfully, did not cultivate their favorite specialty alone,

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but combined with it a wide knowledge of surgical science and art.

He was a member of many scientific societies, and among them may be mentioned the College of Physicians, the County Medical Society, the American Medical Association, the Pennsylvania State Medical Society, the Pathological Society of Philadelphia, the Academy of Natural Sciences, and many others.

There are few members of our profession to whom nature has been so kind as she was to Dr. Goodman, whom she generously endowed with the most attractive and striking physical characteristics. More than six feet tall, with regular features and delicate complexion, his presence was both noble and distinguished; his manners were unassuming, but courteous, while his aversion to pomp and pretence was well known. Wholly unselfish and genially disposed, he enlivened and cheered all with whom he came in contact, and in an especial degree contributed to the comfort, support, and fortitude of his less fortunate professional brethren. Of Dr. Goodman, however, it could not be said that he always "wore his heart on his sleeve." The remarkable breadth and depth of feeling of which he was capable, as well as his goodness and kindness of heart, were facts known only to the fortunate recipients and to a limited circle of intimate friends. It is worthy of mention that without exception, so far as I know, every resident physician that served under him in the Medico-Chirurgical, Wills Eye, and Orthopædic Hospitals, has expressed intense gratitude for the deep interest he took in their work and the unusual facilities he offered them in the way of operative work and clinical research. To illustrate his generosity of heart, the following story may be briefly narrated: A resident of the Wills Eye Hospital was taken ill, and, although almost a stranger, Dr. Goodman drove up with his carriage and removed him to his home, where he kindly treated and nursed him for two weeks. During the period of convalescence, which lasted about four weeks, he took him for a daily drive through Fairmount Park, and cheerfully bestowed

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all attentions needful to hasten his recovery and to add to his personal comfort.

One of Dr. Goodman's chief distinctions was his conspicuous military career. The official record of his service in the field shows that he rose by a rapid succession of promotions from the rank of Major and Surgeon, 28th Pennsylvania Infantry (July 23, 1861), to that of the culminating point of his honorable record, Medical Director of the Army of Georgia, with the pay and rank of Colonel. On November 3, 1864, he was relieved at his own request and honorably mustered out of service.

As a valuable illustration of the undeniable power of the character of this gentle and sympathetic medical officer, the following now historic event will repay sober thought: "At the battle of Ringgold, Ga., one of Dr. Goodman's brothers (of whom five were in the service) received a wound in the thigh, and, as the army had to march at once, a consultation of surgeons decided that the injured limb must be amputated near to the hip-joint. The operation was assigned to Dr. Goodman. Without protest, without hesitation, the feelings of the brother were subordinated to the duty of the surgeon, and that wounded brother now lives to tell the story of fraternal devotion."[1]

In February, 1861, he joined the Union League, and soon became a frequent and interested visitant. It is quite probable that here the society of companionable friends served to draw his attention away from himself, thus helping him to forget the treacherous, incurable affection from which he had been a sufferer for many years, and of whose existence he was fully aware. He enjoyed in an unusual degree the respect of that distinguished body, while his pleasing manners and bearing rendered him its most popular member. His intimate friend and associate, Dr. Ziegler, has informed me that it was Dr. Goodman's unvarying custom to seek strangers or newly-elected members, and to bid them cordial welcome. Without solicitation he was several times elected to the office of Director

[1] Memorial address at the presentation of Dr. Goodman's bust to the Union League of Philadelphia, by Robert Eden Brown, Esq.

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and later Vice-President of the League, receiving each time a vote in excess of all competitors. "To these offices he brought the same earnestness, gentleness, and conscientiousness that were inseparable from him, and, perhaps, in no position that he had ever held had those attributes been subjected to more crucial tests."

The circumstances attending the closing scenes of his life may be briefly narrated: "In the early morning hours of February 2, 1896," (I quote again from Mr. Robert Eden Brown's memorial address[1]) "a terrible conflagration in the neighborhood of the League House endangered that property and excited general alarm. Dr. Goodman, who had retired late, was startled from his first peaceful sleep by the announcement that the League was on fire. Hastily arousing himself, he hurried to the scene of danger, and there, amid smoke and flame and torrents of water, he encouraged and assisted the firemen in their desperate efforts to save the building. Ever thoughtless of himself, ever careless of danger when duty called, he remained administering to the wants of the exhausted men, unmindful of his own exhaustion and the perilous consequences that might ensue. That was the beginning of the end. A few hours of feverish sleep could not restore his overtaxed strength, and on the following day, while in the discharge of his professional duties, with scarcely a struggle, that gentle heart ceased to beat."

Such is the record of the long, useful life of one who, whilst worthy of high rank in the medical profession, shone out to the world not so much as an original investigator, author, or surgeon, but principally as a man of noble, helpful, generous feeling amounting to rare genius.

[1] Loc. cit.

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MEMOIR OF WILLIAM HUNT, M.D.

By THOMAS G. MORTON, M.D.

[Read February 3, 1897.]

In former times it was the custom, much more so than it is at present, for students, while attending lectures at medical schools in Philadelphia, to join one of the so-called "quiz" classes, which would assemble at some convenient place where examinations would be held upon the lectures of the day.

Many years ago I was invited by a friend and fellow-student to accompany him to one of these exercises, which happened to be on anatomy. I did not know the quiz-master personally, who he was, or even his name; but his pleasant and kindly manners, together with the great interest he appeared to take in the individual members of the class, attracted me, and before the hour was over I resolved to become a member of the class. I did so, and thus began my acquaintance with William Hunt. Our acquaintance gradually ripened into friendship, and this into genuine regard, affection, and love. This relation between Dr. Hunt and myself, so happily inaugurated, continued without the slightest interruption until his death, in 1896, a period of more than forty years.

It is, therefore, to me a source of more than gratification that the College of Physicians and the Academy of Surgery have invited me to prepare a memorial of our late fellow-member, with whom I had been so pleasantly and constantly associated during, I may say, my entire professional life.

William Hunt, the son of Uriah and Elizabeth Shreve Hunt, was born September 26, 1825, at No. 106 North Fourth Street, Philadelphia. He was descended from a long line of Friends (Quakers), his great-grandfather, William, having been widely

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known as a preacher, both throughout this country and abroad, during the early half of the last century. The family first came to America about 1680. Dr. Hunt's great-great-grandfather, with his four sons, came from Scotland and settled in New Jersey and Pennsylvania, whence they emigrated to North Carolina. In 1815 Uriah Hunt left North Carolina to make his home in Philadelphia, where, as he says, he found that at that time "there were not twelve of the name in the *Directory*." He established himself as a publisher, especially of religious works and text-books for schools, and became a successful business man. He was a highly respected member of the Society of Friends all his life.

Dr. Hunt's mother was a daughter of Caleb and Margaret Donaldson, and a granddaughter of Arthur Donaldson, of Revolutionary fame. William Hunt, by descent a member of the Orthodox branch of the Society of Friends, was disowned in 1843 because he acted as groomsman at his sister's wedding, when the latter was married to a member of the Hicksite branch of the Society. He married, on June 3, 1856, at No. 185 (now 515) Arch Street, Rebecca T., daughter of Richard and Lydia Williams Price, and at once commenced practice at his residence on Arch Street below Fifth (then No. 143). They had two sons, William, Jr., and George Wood, both of whom survive him, and one daughter, Margaret Price; the early death of the latter, in 1872, was a great grief to the parents.

Dr. Hunt's early education was received at the Friends' Select School, but on account of delicate health at that time he was unable to enter college. He completed his education under home instruction, after which he entered his father's publishing house, on Fourth Street below Arch, where he remained one year. As mercantile life was utterly distasteful to him, his business career was brief. His father finally yielded to his earnest desire to devote his life to medicine. He accordingly entered the Medical Department of the University of Pennsylvania, and was graduated in the class of 1849, during which time he was a student in the office of Dr. George B. Wood. His thesis was upon the "Treatment of Aneurism."

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Immediately upon receiving his degree he was appointed as substitute for Dr. Spencer Sergeant, who was then a resident physician at the Pennsylvania Hospital. While still acting as substitute, he was elected to succeed Dr. Sergeant, whose illness had proved fatal. It was during his two years' term of service at the hospital in this capacity that he had a severe attack of typhoid fever, and he frequently stated that his was the only case then on record of recovery after a perforation of the intestine. Dr. George B. Wood, in referring to Dr. Hunt's illness, wrote that during the course of the disease he "was suddenly attacked with violent pain in the right iliac region, extending over the right side of the abdomen, with great distention, exquisite tenderness on pressure, and extreme frequency of the pulse. It was the opinion of Dr. Gerhard, who was the attending physician, and my own, that perforation had taken place."[1]

Dr. Hunt, in one of his clinical lectures, incidentally alluded to his own case, using the following words: "While a resident physician in 1850, in the Pennsylvania Hospital, I had an attack of typhoid fever, which became historic and was a theme for medical lecturers in their clinics for many years. I had, according to the opinions of most distinguished attendants (Drs. Wood, Gerhard, and the elder Pepper), every symptom of having perforation of the bowels. The accident was made out completely, but I treated science so disrespectfully as to get well, and so gave no opportunity to confirm the diagnosis."[2]

Dr. Hunt became Assistant Demonstrator of Anatomy in the University of Pennsylvania, under the late Joseph Leidy, and, upon the latter being made Professor of Anatomy, Dr. Hunt was appointed Demonstrator in 1854, a position he held for ten years. The warm friendship and intimacy between Prof. Leidy and Dr. Hunt were terminated only by the death of the former. It was most fittingly commemorated by Dr. Hunt's two addresses, one upon the "Personal History" and the other upon the "University Career" of Dr. Leidy, the former being delivered before the Academy of Natural Sciences of Philadelphia, May 12, 1891,

[1] G. B. Wood's Practice of Medicine, vol. i. p. 393, Phila., 1866.
[2] Clinical lecture on "Injuries to the Spine," Nov. 1881, Medical News and Abstract.

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the latter before the alumni and students of the Medical Department of the University of Pennsylvania, on November 17, 1891.

During two of the years of Dr. Hunt's demonstratorship I was his assistant in the dissecting-rooms. After the work in the rooms was concluded, each night, Dr. Hunt and I would adjourn to a neighboring German restaurant and spend half an hour in social chat on matters of mutual interest, both professional and personal. I now look back upon that period as a most enjoyable part of my professional life.

Dr. Hunt was elected to the surgical staff of the Episcopal Hospital in 1853, upon which he served ten years. During part of this period (from 1857) he also served at Wills Hospital for the Indigent Lame and Blind. He resigned from both the Episcopal and Wills Hospitals upon his election to the staff of the Pennsylvania Hospital, as one of the attending surgeons, in September, 1863. In the latter position he served continuously for thirty years, becoming Senior Surgeon of the staff upon the death of Dr. George W. Norris, in March, 1875.

Among the seventy-two names upon the list of members of the Medical and Surgical Staff of the Pennsylvania Hospital, from its organization in 1750 to the present day, a period of nearly a century and a half, there occur only three whose term of service was longer than Dr. Hunt's—Dr. Thomas Bond served thirty-two years; Dr. Thomas Parke, forty-five years; and my own record, which is thirty-three years this month.

It was formerly the custom of the surgeons of the hospital to go on duty, in rotation, for three months each year. Believing it better for the surgical work to have a more continuous service, Dr. Hunt suggested changing the period to six consecutive months, two of the surgeons being on duty at a time—a plan which was adopted about 1870 and has been since continued. Dr. Hunt was also Consulting Surgeon of the Pennsylvania Institution for the Deaf and Dumb and attending Surgeon to the Orthopædic Hospital. From the latter he resigned in the fall of 1889. He was appointed one of the Governors of the Gynecean Hospital of Philadelphia in 1889.

Dr. Hunt became a member of the American Medical Associa-

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tion in 1852 and a Fellow of the College of Physicians in 1854. He was elected a member of the Museum Committee in 1857 and Curator in 1858; in 1863 he was made a member of the Mütter Museum Committee, temporary Curator in 1874, and Chairman from 1879 to 1895. He became a member of the Academy of Natural Sciences of Philadelphia in 1855, and of the Philadelphia County Medical Society in 1876; a Fellow of the Philadelphia Academy of Surgery in 1879, and its President from January, 1891, to January, 1895. On his retirement from office the thanks of the Academy were tendered him for his faithful and valued service and his considerate and courteous performance of his duties as presiding officer. He was a Trustee of the University of Pennsylvania from 1879 to 1895, and he was elected an Honorary Member of the American Surgical Association in 1882. He was also a Director of the Philadelphia Contributionship, a fire insurance association, from 1882 to 1895. He was elected a member of the Society of the Sons of the Revolution in 1890. In the records of that society it is noted that he was a great-grandson of Arthur Donaldson, who was engineer in charge of the defences of the Delaware River during the Revolutionary War.

Dr. Hunt was one of the original incorporators of the Microscopical and Biological Section of the Academy of Natural Sciences, and in its early days was one of the most active members. He was also a member of the Alumni Society of the Medical Department of the University of Pennsylvania, of the Historical Society of Pennsylvania, and of other organizations. He was one of the original members of the former Biological Club of this city, which merits a few words in digression.

The "Biological Club" was a social organization formed among the members of the Academy of Natural Sciences about 1859, during the time of activity in the biological section. The meetings of the club were held in rotation at the residences of the members, and were very informal, and, at first, the refreshments were crackers and cheese, and ale. The rigid sumptuary laws of the early days, however, did not last; the simple fare expanded into a supper, to be succeeded about 1870 by a dinner. For over thirty years the club continued to meet regularly, without the loss

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of a member, thirteen members being generally present. It finally dissolved, principally owing to losses by death.

Dr. Hunt was also one of the original members of the "Surgical Club," which was organized in 1877 by a few Philadelphia surgeons, among whom were Agnew, the two Grosses—father and son—Levis, Maury, and Reed, and no additions were ever made to the original membership. It was designed as a semi-social scientific association, meeting twice a month at the members' houses, when interesting cases were presented and informally discussed. Following this there were simple refreshments and social intercourse. Two years later, in 1879, when its members formed the present Philadelphia Academy of Surgery, the "Surgical Club" was made entirely a social organization. The surviving members continue to meet occasionally during the winter season to dine together.

Dr. Hunt was eminently social in his disposition and was always a welcome guest at the Wistar and other parties, and on less formal occasions among his professional friends. But the one entertainment which gave him probably the greatest pleasure was the "Sylvester Eve" gathering each year at the home of Dr. Albert Fricke. These were charming evenings, quite unique and ever to be remembered, where wit and genial humor prevailed, and to be noted as extraordinary in their bountiful hospitality.

At the close of each year the same chosen few assembled to bid adieu to the old year and to welcome the new. From time to time a vacant place was noticed, and, among those missed during recent years, there was none whose absence was more sincerely regretted than Seidensticker, Leidy, and Hunt. Dr. Hunt was present on the eve of the new year of 1895, and this occasion was the last time that he was an evening absent from his home.

Dr. Hunt was appointed an Acting Assistant Surgeon of the United States Army, May 16, 1862, serving until October 31, 1863, when, as shown by the records of the War Office at Washington, his contract terminated. He had been previously detailed by Surgeon-General Henry H. Smith, of the Pennsylvania Volunteer Service, for duty at St. Joseph's Hospital, Philadelphia, April 18, 1862, in caring for the wounded soldiers.

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In December, 1862, Dr. Hunt wrote to the Sanitary Commission expressing his willingness to "co-operate in its examination into the condition and wants of the United States Military Hospitals," and under date of March 30, 1863, his proposition was accepted and he was directed to make a tour of the service. He was consequently appointed a "Special Inspector of the General Hospitals of the Army," and in that capacity was entitled to all the benefits of the order of the Secretary of War, dated June 13, 1861, directing and enjoining all persons in the employment of the United States forces to respect and further the inquiries and objects of this commission to the utmost of their ability. His commission received the indorsement of the Surgeon-General of the United States Army. Dr. Hunt was instructed to report on April 15th, at New Haven, Connecticut, to inspect the general hospitals at that place, and thence, successively and in the order most convenient, to examine the army hospitals at Newport, Portsmouth Grove, Boston, Massachusetts; Brattleboro and Burlington, Vermont, for the remainder of the month, concluding with the direction to visit and examine in a general way the hospitals at Newark, N. J. He was on duty in active service at Frederick City, Maryland, from September 21st to 26th. On the latter date he was ordered back to Philadelphia to assume the duties of Acting Assistant Surgeon at the Fifth and Buttonwood Street United States Army Hospital. On October 14, 1862, he was relieved from duty at this hospital and assigned to duty at the new hospital for wounded officers at Camac's Woods, Philadelphia (now Eleventh and Norris Streets). It was during this service that Dr. Hunt's contention that it is not the duty of physicians, serving in hospitals on contract, to attend sick and wounded officers out of hospitals, without compensation, was upheld by the Surgeon-General of the United States Army, in a communication dated October 7, 1862.

Many of the wounded officers rested in Philadelphia for treatment, *en route* to their respective homes, and it was at the house of Morris L. Hallowell, No. 912 Walnut Street, who for this purpose generously gave up his own private dwelling (called by Oliver Wendell Holmes the "House Beautiful"), that Dr. Hunt and Dr. Thomas G. Morton attended Colonel Norwood Penrose Hallowell,

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Colonel Edward Needles Hallowell, Colonel Francis W. Palfrey, Captain Oliver Wendell Holmes, Jr. (now Judge Holmes, of the Supreme Court of Massachusetts), and many others, all officers in the army. In a characteristic punning letter to Dr. Hunt, Dr. Holmes afterward acknowledged the services to his son with "Good-by, my kind friend and my son's friend, whom I have delicately commemorated in my 'Hunt after the Captain.'" Later, as a further evidence of appreciation, he sent him author's copies of all his works published to that date, May, 1863.

Dr. Hunt for a number of years was one of the editorial staff of the *Annual of the Universal Medical Sciences*, still published in this city, and was also a rare but highly esteemed contributor to the *American Journal of the Medical Sciences*. In the *Transactions of the College of Physicians of Philadelphia* are several communications from the pen of Dr. Hunt. Among the special articles of which he was the author may be mentioned "A Memoir of George W. Norris, M.D., Vice-President of the College of Physicians, etc., 1876;" "Popular Fallacies about Surgery," *Lippincott's Magazine*, December, 1881; "The Rights of a Consultant to Compensation," *Medical News*, December 15, 1888; "Diabetic Gangrene," *Transactions of the Philadelphia County Medical Society*, November 28, 1888.

In reference to the paper on "Diabetic Gangrene" it may be stated that Dr. John S. Billings, in acknowledging, under date of February 1, 1889, a copy which had been sent to the Library of the Surgeon-General's Office, Washington, wrote: "I have read the paper with much interest. I know of no other American paper on the subject." He also edited Wilson's *Dissector's Manual* in 1858, and in conjunction with Dr. Thomas G. Morton compiled a *History of Surgery in the Pennsylvania Hospital*, 1880.[1]

[1] The titles of all the articles contributed by Dr. Hunt to medical literature, etc., as far as can be ascertained are as follows:

"On Phosphorus Necrosis," American Journal Med. Sciences, vol. xlix., 1865.

"On Ossification of the Crystalline Lens," American Journal Med. Sciences, vol. xlviii., 1865.

"Death from Hemorrhage, Caused by a Sharp Sequestrum Cutting the Popliteal Artery," American Journal Med. Sciences, vol. l., 1865.

"Case of Coexistence of Tetanus and Paralysis," American Journal Med. Sciences, New Series, vol. xlv., 1863.

"On Fractures of the Larynx and Ruptures of the Trachea," American Journal Med. Sciences, Article IX., April, 1866.

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Some thirty years ago, when it was decided to publish the *Pennsylvania Hospital Reports*, Dr. Hunt, with Dr. J. M. Da Costa, undertook the labor of editing them, and he contributed personally several clinical papers to the volumes published in 1868 and 1869, when the series was discontinued. He also contributed articles to the *International Encyclopædia of Surgery* and assisted in preparing the American edition of Holmes's *System of Surgery*. His interest in general medicine and in science was shown by his membership in the Academy of Natural Sciences of Philadelphia (being one of the incorporators of the Microscopical Section of this

"Physiological Observations and Experiments on a Case of Large Artificial Anus, with an Account of the Surgical and Mechanical Efforts to Cure." Penn. Hosp Reports, vol. i., 1868.

"A Contribution to the History of Toxæmia," Penn. Hosp. Reports, vol i., 1868.

"Fatal Chorea. Death Consequent on the Aggravation Caused by a Simple Fracture of the Humerus," Penn. Hosp. Reports, vol. ii., 1869.

"Extracts from Clinical Lectures," Penn. Hosp Reports, vol. ii., 1869.

"The (Morton) Ward Carriage," Penn. Hosp. Reports, vol. ii., 1869.

"Traumatic Rupture of the Urethra," Philadelphia Med. Times, 1871.

"Unusual Surgical Cases," Philadelphia Med. Times, 1872.

"Clinical Notes and Reflections," Philadelphia Med. Times, 1875.

"A Memoir of George W. Norris, M D.," Transactions College of Physicians, 1876.

"On Inequality in Length of the Lower Limbs, etc.," American Journal of Med. Sciences, January, 1879.

"Letter on the Case of President Garfield," Med. News and Abstract, November, 1881.

"Clinical Lecture on Injuries of the Spine," Med. News and Abstract, November, 1881.

"Popular Fallacies about Surgery," Lippincott's Magazine, December, 1881.

"Fœtal Burns during Advanced Pregnancy, the Burns of the Mother apparently impressing themselves on the Child *in utero*," American Journal Med. Sciences, January, 1881.

"Esmarch: Antisepsis and Bacillus," Medical News, January, 1883.

"Discoveries in Regard to Bacilli," Medical News, 1884.

"The Rights of a Consultant to Compensation," Medical News, 1888.

"Diabetic Gangrene," Trans. Philadelphia County Med. Society, November, 1888.

"Health Gymnastics at Baden-Baden," Philadelphia, 1888.

"Vesical, Urethral, and Preputial Calculi," in Keating's Cyclopædia of the Diseases of Children, vol. iii. p. 596. Philadelphia, 1890.

"In Memoriam: Dr. Joseph Leidy, Personal History," read at the Academy of Natural Sciences, May 12, 1891.

"An Address upon the late Joseph Leidy, M.D., LL.D., His University Career," read before the Alumni and Students of the University of Pennsylvania (Medical Department), November 17, 1891.

"Address before the Graduating Class of Nurses, St. Luke's Hospital, Bethlehem," 1893.

"Cystic Growth within the Internal Condyle of the Femur," Transactions of the American Surgical Association. [By Drs. Morton and Hunt.]

In Holmes' System of Surgery, first American from second English Edition, Philadelphia, 1881, Dr. Hunt revised the following articles: "Erysipelas," Campbell D. Morgan, F.R.S.; "Pyæmia," George W. Callender, Esq.

To the International Encyclopædia of Surgery, vol. i., New York, 1886, Dr. Hunt contributed the article on "Traumatic Delirium and Delirium Tremens."

Dr Hunt, with Dr. Morton, prepared the articles on "Orthopædic Surgery," for series 1888 and 1889 of the Annual of the Universal Medical Sciences, edited by Dr. Sajous, Philadelphia.

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organization), and also by his membership in the American Medical Association, to which he was elected a delegate from the College of Physicians on five different occasions.

During the period of painful suspense that followed the wounding of President Garfield and the controversies, in which both medical and lay press joined, with regard to the proper management of gunshot-injuries of the vertebræ, and the criticism of the actual methods adopted by the physicians in charge of the distinguished patient, were engaging the attention of surgeons all over the world, Dr. Hunt, aroused especially by what he considered to be some very unjust aspersions upon the attendants on the case by a noted German surgeon, wrote several articles in defence of American surgery, which were widely published. It was in connection with this subject that Dr. Oliver Wendell Holmes wrote to Dr. Hunt, and, as the letter is written in the characteristic style of the Philosopher of the Breakfast-table, I will take the liberty of introducing it here, the more willingly because it contains some autobiographical references which should not be lost:

BOSTON, November 18, 1881.

"DEAR DR. HUNT: I received *Lippincott* (which I intended to have bought, of course) this day, and sat down at once and read your article in it. I was greatly interested in it, as all medical and semi-medical readers must certainly be. I think the average reader of the *Atlantic*, who is more literary than scientific, would consider it rather professional for that magazine.

"I am pleased to say that I have also found, this same day, in a pile of pamphlets, which came on me like an avalanche, 'On Injuries of the Spine' and 'Correspondence,' which you were kind enough to send me with your regards. I believe that I told you that I had until within a few days been very busy with my memoranda for the *Memorial History of Boston*. I got off my second revise yesterday, so that I could sit down in peace and read both your articles deliberately, which I did after finishing the one in *Lippincott*. I could not help being interested in these, as you may well suppose. Your theory or argument relating to the

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part played by the sympathetic in injuries to the bones on which the chain of ganglions lie seems to me entirely reasonable. It is just what ought to have been thought of, but I think you have the merit of first suggesting it.

"Your letter about President Garfield's case is excellent and will be most acceptable to the profession, I have no doubt. I read every word of it with great pleasure, agreeing with all you said.

"I am an outsider in every point of view, and I have not forgotten the Dutch saying, of which, in fact, I am rather fond— 'The man on the dike bowls well.' But I cannot help remembering some of my own oracular dicta delivered from the domestic tripod, two of which are called to mind by your pages. In the early days of the President's wound I, too, said and repeated until it bored the household, 'whereof he languished, and languishing did die.' I, too, suggested to my fireside audience that the thoracic duct might have been injured, which would account for the great emaciation. (I remembered the case of Calvin Edson, the living skeleton.)

"I, also, sitting on the dike, proposed to fitting, not promiscuous hearers, the enemata of defibrinated blood, which a day or two afterward I saw had been administered. So you see what a doctor was lost when I took to writing verses and stories.

"But let me close my letter by thanking you, most sincerely and heartily, for the great pleasure and the abundant instruction which your most valuable papers have afforded me. Believe me, dear Dr. Hunt, Faithfully yours,

"O. W. Holmes."

In connection with the same subject I have also found, among the private papers of our late Fellow, several very interesting letters (which, like the preceding, have never been published) from our former President, Dr. D. Hayes Agnew, one of which contains certain comments upon the wound of President Garfield and upon the pathology of this class of injuries, and especially upon the influence of the psoas magnus muscle in concealing gunshot-wounds of the lumbar vertebræ, which really constitutes a practical contribution to the literature of this department of surgery.

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Dr. Agnew writes:

"AUGUST 23, 1881.

"MY DEAR HUNT: The (President's) case is a very plain one and demands no unusual skill to manage, as you well understand. It was a grave injury at the start, and continues to be so, and, while by no means hopeless, the result, in my judgment, is very doubtful. The popular mind cannot, of course, understand, what is so clear to you and me, that even though a bullet may not enter the serous cavity of the chest or abdomen, yet in traversing the line of both of these cavities outside of the pleura and peritoneum immense damage may be done. The track of the ball has been traced from the point of entrance behind the eleventh rib through the loin and forward beyond the anterior border of the iliac fossa; this would make a distance of at least sixteen inches. The simple state of things is this: that, at the time the first operation was performed, when rigors, sweating, and high temperature occurred, the President became septicæmic, and all the phenomena since have been due to this. There is no evidence, however, of any metastatic abscesses, no chest symptoms, and no kidney trouble, and consequently he may, possibly, weather it yet."

"OCTOBER 8, 1881.

"DEAR DR. HUNT: There are but two points which I think you have omitted, which have any material bearing on the subject.

"First. The influence of the psoas magnus in concealing shot-wounds of the lumbar vertebræ, at least wounds of entrance.

"Second. The thoroughness of the drainage secured by properly planned incisions.

"You are right in regard to no exploration having been made by the consulting surgeons on being called to Washington two days after the shooting, although Bliss, in his slipshod article in the *Record*, says such explorations were made. You are right, also, in stating that the nervous symptoms were chiefly in the right limb and altogether on the right side of the scrotum. I may also say that the early disappearance of these symptoms; the absence of any loss of power in the lower extremities; the general direction of all instruments used in explorations of the wound, for washing, being downward; the appearance of a well-defined

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ecchymosis over the abdominal parietes a few days after the accident, above the anterior superior spinous process of the ileum, with corresponding tenderness to pressure, and the tingling of the left scrotum favored the opinion that the ball might be in the walls of the abdomen in the above locality, though, as I said to you before, I never pretended to know where the ball was. There was no psoas abscess. The opening in vertebræ was not discovered until the psoas muscle was laid open. Your friend truly,

"D. HAYES AGNEW."

With regard to a disputed point in the published account of the case, Dr. Agnew confirmed Dr. Hunt's statement in the following letter:

"DECEMBER 5, 1882.

"DEAR DR. HUNT: You are right; no examination was made by the consulting surgeons at the time of their visit. They were informed that careful explorations had been made at the time of the shooting by Bliss and by Wales. Bliss admits that he committed an error on this point, writing, as he did, in New York and without any notes to refer to.

"I have examined all accessible sources and find no case of perforating shot-wound of the vertebræ which did not prove fatal, and I think you may challenge Esmarch to produce from the records of surgery a case of recovery in which this injury was positively determined. Remember and draw a distinction between perforating and all other shot-injuries of the spine. Indeed, few of any degree recover. Your friend truly,

"D. HAYES AGNEW."

If we recall the time when this celebrated case was the general topic for discussion among surgeons, we may better understand how Dr. Hunt was led to enter the lists both by his patriotic desire to uphold the credit of American surgery and by loyalty to his friend Agnew, whom he considered to be held up to censure in a clinical lecture in which Prof. Esmarch had reviewed and sharply criticised the treatment of the distinguished patient by his medical attendants.

When the closure of the lying-in wards of the Pennsylvania

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Hospital was under discussion, the assertion was unjustly made in a medical journal that the cause of this action was the great prevalence of puerperal fever, which had been attended by unusual mortality, in this institution. Dr. Hunt wrote a letter to Prof. S. D. Gross upon this subject, which well illustrates his ability as a writer and his skill in presenting the facts and argument in as few words as possible and keeping directly to the point. With his published communication on "Hospitalism" it forms a really valuable addition to the controversy upon the relation of puerperal fever to infection.

About the same time that this letter was written Dr. Hunt had published a communication in the *Philadelphia Medical Times* on the subject of "Hospitalism," defending the institution with which he had been prominently connected for many years from the sweeping charges of maladministration made by an essayist belonging to the Public Health Association. (This also appears in *Surgery in the Pennsylvania Hospital*, p. 342 *et seq.*)

Dr. Hunt's contributions to medical literature show that his writings were never prepared in an egotistic spirit, to bring himself or his views into prominence, but were always inspired with a desire to refute error or to advance the cause of science. Dr. Hunt's sense of humor was very keen, and he was fond of repartee, clever jests, and witticisms, this being shown by his writings as well as his daily conversation. An illustration of his appreciation of the ridiculous aspect of even serious questions is afforded by the following unsigned communication which he sent to the editor of the *Medical News:*

"MAGDEBURG, January 31, 1884.

"To the Editor of The Medical News:

"SIR: I have thought that some account of the recent discoveries in regard to bacilli might interest readers who are remote from the great radiating centres of constructive science. The latest of these discoveries is even yet spoken of here with caution; but by the time you have printed this it will have revolutionized one branch of physiology and produced an evolution of novel ideas, the final results of which not the boldest can predict. But before outlining for your readers a discovery which I am privileged to

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communicate by permission of Prof. Coccischlächter, and before it has been fully published at home, it may be well to describe the Krankheitenursprungsanstalt's Museum of Bacilli collected by the Herr Ober-Professor Keimerzeuger von Verdammt-Narrburg.

"This has been done at the cost of more than one life upon the altar of science. The museum is a room about thirty feet square, with double walls of glass, between which circulates water kept at a temperature of 30° C. by three gigantic thermostats, which are so accurate that the heat does not vary the one-fiftieth of a degree. Ranged along the sides, exposed to air or under glasses, are hundreds of half-potatoes on which grow various bacilli; of late, however, boiled cabbage is said by Keimerzeuger to answer better. Certain specific cocci flourish on the *Beta altissima* or mangel-wurzel, but as to this choice of cultur-gartens more is to be said. To walk through this museum with the Herr Professor Keimerzeuger is interesting. Before entering a mask is given you and a bottle of condensed oxygen, so as to enable you not to inhale the atmosphere loaded with germs. In tones muffled by the need to speak within the mouth-piece you learn that to the left is a tubercular potato, its surface gray with the potencies of countless deaths. Near it the bacillus of rheumatism flourishes on the cut surface of the succulent beet beside the ruddy germs of specific disease. Scarlet fever infests this potato, diphtheria that. The new bacterium of pneumonia flourishes on a boiled watermelon, and glanders, cholera, smallpox, and hydrophobia spread in tiny greenish growths over the little gardens of gelatin. For a moment, in my interest I displaced my mask. The Professor instantly seized me and hurried me from the room. 'What a risk!' he said; 'my last assistant did as you did, and died in seven days of acute phthisis with symptoms of hydrophobia and whooping-cough, combined in horrible equality.' I did not desire to re-enter this box of Pandora. In adjoining apartments of less size are the experimental cultivations, —those which are still in doubt. Among the most interesting is the micrococcus of gout, found to flourish best upon gelatinized turtle-soup.

"A most striking practical result has grown out of some of Coccischlächter's and Keimerzeuger's later researches. They have

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been able to show that the bacterium of colic flourishes on the green apple, which accounts for the gripes experienced by youthful gourmands. But far more remarkable is the fact that certain micrococci and bacteria die, as proved by Coccischlächter, in some culture-materials and thrive, as shown by Keimerzeuger, on others. Thus the tubercle-bacilli flourish on boiled cabbage (Keimerzeuger), but perish on moist sauer-kraut (Coccischlächter); so that by a persistent diet of the latter article they have been able to saturate some of their devoted assistants up to the point of insusceptibility—a discovery which will, we trust, put an end to the cavils at the failure of these researches to yield practical results. . . . ."

In October, 1893, Dr. Hunt gave an address at St. Luke's Hospital, at Bethlehem, Pa., in which he related an incident which happened many years ago at the Pennsylvania Hospital, and which he always said was one of the most ludicrous he had met with, among many, in his long experience.

"Those of you," says Dr. Hunt, "who are familiar with the story of *Rab and his Friends* can fully realize the relations between the surgeon, the poor cancer-stricken patient, and the students. The author most touchingly and truthfully pictures scenes which are familiar in every general hospital. Sometimes these scenes are highly amusing in the midst of the tragedy.

"The idea of anything amusing in a hospital!

"I had occasion to amputate the thigh of a negro in the clinic. There was a large audience. I knew nothing of the previous history of the patient. The operation was over. The stump was sewed up, but not yet washed. I had on my apron, which was pretty well stained. The patient was let up out of the ether. Slowly he raised his head and took a deliberate view of the bloody stump, then, addressing me in a tragic voice: 'Be thy intents wicked or charitable?' 'Charitable,' I said. 'Thou comest in such a questionable shape,' and as he was being wheeled out of the room he called back, 'Hamlet, King, father, Royal Dane,' amidst the laughter and uproar of the class. He made a good recovery. Here the laughter was allowable; the farce succeeded the tragedy, the unconscious humor of the patient over his own case took away

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for a moment the pity of it. I have known the highest tension of the operator relieved by some pleasantly whispered conceit of a bystander or assistant. So humor has a place even in a hospital. It is not always necessary to be 'dressed in an opinion of wisdom, gravity, profound conceit.'"

Early in October, 1886, Dr. Hunt, with Dr. Leidy and a number of Philadelphians, made a visit to Luray Cave and the Natural Bridge of Virginia. The object of the visit was to select and dedicate a column in the cave to Dr. Leidy. A preliminary tour was made of the cave by the party in order to select the column, after which the Natural Bridge was explored. The stalactite selected was very large, and, indeed, was said to be the largest in the world. On reaching the column in the cave Dr. Hunt, as chairman of the committee, made the following short address:

"This column and that stalactite in the caverns of Luray are dedicated to Professor Joseph Leidy. May they thus aid to perpetuate the name of one who, holding communion with the visible forms of nature, has so learned to interpret her grand simplicity that to hear him is to understand.

"From now on these objects will be known as the 'Leidy column' and the 'Leidy stalactite.'"

The scene as Dr. Leidy stepped to the front was an impressive one. He was surrounded by loving and admiring friends, and the dark shadows and fantastic images from the torch-lighted stalactites thrown over the party made a scene not soon to be forgotten. His voice trembled with emotion, but grew stronger as he proceeded to thank the company for the honor done him in naming one of nature's wonders after him, following his remarks by saying that monuments made of stone had never met his approval, but under such a monument he would gladly repose after his work was done.

With the exception of the attack of typhoid fever at the outset of his medical life, already mentioned, and the illness resulting from the injury received late in life, Dr. Hunt enjoyed exceptionally robust health. One curious fact, however, must not be overlooked —Dr. Hunt was extremely susceptible to certain bad odors, and was made ill promptly by them. In his article entitled "A Con-

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tribution to the History of Toxæmia" he relates that "while remarkably sensitive to the effects of poisonous plants, such as the varieties of *rhus*, I have never yet had so much as an angry pustule arising from various scratches, punctures, and abrasions received from instruments and bony spicula while making dissections or performing operations," yet he was several times made seriously ill by effluvia or noxious emanations from the human body. In this article Dr. Hunt says "the train of symptoms was so exactly alike in the different attacks that I am sure that there can be no mistake as to the cause, and, as I do not remember to have read of similar cases, it may be well to record mine as a contribution to the history of blood-poisoning and as an illustration of the hazards of hospital and professional life." In later years Dr. Hunt was always exceedingly careful to avoid placing himself where he would be exposed to a recurrence of his former serious experience.

On March 4, 1887, Dr. Hunt met with a grave accident. While crossing the street in the early evening, he was knocked down and run over by some passing wagon and received an injury to the cervical vertebræ (which was then believed to be a fracture); also several scalp wounds and probably intracranial injuries. He was confined to bed for several months, and, his health having been greatly impaired, he subsequently went to Europe. At Baden-Baden he took a course of gymnastic treatment, by which he was benefited so much that he was able to resume to some degree the active duties of his profession upon his return home in the fall of that year. His experience at Baden-Baden was the subject of his widely read pamphlet on *Health Gymnastics at Baden-Baden*, Philadelphia, 1888. He went abroad again in 1889, and greatly enjoyed visiting the London hospitals. On his return home he continued in active practice until 1892, when, his health again being impaired, we spent a month together on a trip to Florida. One year later the effect of the injuries received in 1887 so disabled him that he was compelled finally to retire, and he also resigned the various positions in which he had been a zealous worker up to that time. He gradually declined in health, and died at his home, where he had lived for thirty-five years, at the southwest corner of Thirteenth and Spruce Streets, Philadelphia,

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on April 17, 1896, in the seventy-first year of his age. He was buried at Laurel Hill Cemetery.

In early life Dr. Hunt had been rather delicate and spare in figure, although of later years he grew quite stout as he became less active in habits. He was of average height; his face was generally ruddy and constantly wore a pleasing expression; his features were attractive and regular, although not finely cut. His eyes were blue and most intelligent, often twinkling with mirth. He was brimful of jokes and made ready puns. We all remember with pleasure, and were ready to hear, "Hunt's stories," which were very often based on trivial incidents occurring in his personal experience. He was an attractive and instructive lecturer, a judicious and safe operator, and considered a consultant of excellent judgment. His thorough knowledge of anatomy, which he loved profoundly, together with his clear perception and extensive clinical experience, coupled with a pre-eminently conservative nature, all combined to make him a successful surgeon.

Dr. Hunt was also fond of general literature, and, having an excellent memory, he retained what he read. In his writings he had not only a good English style, but also one eminently characteristic. He perfectly mastered the German language, which he spoke fluently.

Dr. Hunt was an intense lover of nature and quite an amateur botanist. During his summer journeyings he studied flowers, and especially wild flowers, and he gave great pleasure to those about him in demonstrating those beauties of plant-growth, which, perhaps, scarcely visible to the unaided eye, could be easily recognized through the small but powerful lens which he always carried in his vest-pocket.

Dr. Hunt had a kind and cheering word for all, rich or poor, with whom he came in contact; especially was this so with the patients of the hospital wards, many of whom came to him after their recovery to express their gratitude, often tendering him, with their thanks, some trifling object. No one ever heard Dr. Hunt speak harshly; but his was a kindly way with everyone, and it was this natural, gentle, assuring manner that made him so welcome by the sick-bed and in the wards of the hospitals. He was a wise

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counsellor and an honest man in every relation of life; he was esteemed and beloved by all who had the privilege of his friendship, and all who knew him will bear testimony to his retiring, modest, unselfish, and noble character.

Although averse to forms and ceremonials, and not what is commonly known as a churchman, yet Dr. Hunt was a consistent believer in the principles and tenets held by the members of the Society of Friends, with whom he always affiliated. The following brief but comprehensive declaration of faith was recently found among his papers, in his own handwriting:

God, I acknowledge Thee;
As in the driven leaves of the autumn's morn,
So in the thunder of the battle's storm,
Source of my faith, I acknowledge Thee;
Father, bless Thou me.

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A BIOGRAPHICAL SKETCH OF HENRY HARTSHORNE, M.D., LL.D.

By JAMES DARRACH, M.D.

[Read June 2, 1897.]

Dr. Henry Hartshorne was born March 16, 1823, on Arch Street below Tenth, Philadelphia. He died February 10, 1897, at Tokyo, Japan.

We all remember Dr. Hartshorne's personal appearance—short of stature, thickset figure, a slow, deliberate gait, and an erect carriage. He had a radiant countenance, with a serene reserve of manner, a symmetrical head, blue eyes, with a mildly staring expression.

Dr. Hartshorne descended from a sturdy, intellectual, and God-fearing set of men. "His first American ancestor was Richard Hartshorne, who left England on account of religious persecution. He settled in the Neversink Highlands in 1669, and as one of the Proprietaries, in association with the Duke of York and William Penn in 1682, he became one of the largest landholders in the Province of New Jersey." His father, Dr. Joseph Hartshorne, was a distinguished surgeon; he was a man of vigorous constitution, and possessed a clear, strong intellect. It is said that "for forty years after he entered upon the practice of medicine he had not to lay off over two or three days from fatigue or sickness." His mother, the daughter of Isaac Bonsall, a prominent preacher of the Society of Friends, was a gentle and cultured woman, and I am disposed to think that her son Henry inherited her qualities of mind and disposition. Henry is said to have had a quick temper, and at one time, having given way to a fit of passion, he

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was found soon after, sitting on the stairs, and when asked why he was there, his answer was, "I am cooling off." This was, most likely, his first lesson in self-control and discipline. In after years he manifested remarkably this governing of self. It is said no one ever saw him angry, and his complacent amiability under the gibes which at times all must have suffered was remarkable. Dr. Hartshorne's home influences were such as to develop gentleness and independence. His father, it is said, encouraged his children to express their opinions with freedom.

At the age of thirteen years Henry entered Haverford College, then called Haverford School. He was considered a bright lad, and accomplished his tasks with ease and rapidity, though not noticeably studious. He received his degree of A.B. in 1839. After having completed his academical course, his father was desirous for him to choose medicine for a career. When Henry finally consented, he remarked to an intimate friend that he was "going to try to love the study of medicine." Later on he said that he loved the study of medicine, but that he found the practice of the art distasteful—a curious phase of heredity, since his father, Dr. Joseph Hartshorne, had manifested the same disinclination, and for a time resisted the importunities of his advisers to enroll his name with the sons of Æsculapius.

Henry, having decided to gratify the desire of his parent, matriculated at the University of Pennsylvania and took his degree of M.D. in 1845. The honorary title of LL.D. was conferred upon him by this institution in 1884.

While studying medicine he had a severe and dangerous illness from a dissecting-wound, which left one of his forefingers disabled for life. In 1846 he was elected one of the resident physicians of the Pennsylvania Hospital, a position most highly prized and sought after by young physicians, where they obtained invaluable knowledge and experience in the diagnosis and treatment of disease, and great advantages in every way from their constant intercourse with the eminent physicians and surgeons which this time-honored institution always could command. I have been informed by one who was a fellow-student of Dr. Hartshorne's and a co-resident at the Pennsylvania Hospital, that while, as might be expected, he

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faithfully fulfilled his duties, he did not then manifest the studious habits which he developed so pre-eminently soon after commencing the practice of medicine.

In 1849 Dr. Hartshorne married, and the lady of his choice was Mary Brown, the daughter of Jeremiah Brown, of Philadelphia.

Dr. Hartshorne commenced the practice of his profession on Callowhill Street near Twelfth; he soon after removed to the house of his father after the decease of the latter, and subsequently to Arch below Fifteenth Street, and although the usual doctor's sign was displayed, I imagine he did not encourage practice, for, as already mentioned, having a distaste for it, and having a competency, he was enabled to choose the path of usefulness which he thought best adapted to his temperament and constitution of mind. One cannot but feel that his active mind and his broad spirit of philanthropy needed a wider field than that afforded by the usual routine of daily practice which is the lot of the majority of physicians. He held himself, however, as a reserve to answer to the calls of humanity, and one of these calls came from Columbia, Pa., in 1854, where an epidemic of cholera had broken out. He promptly left his home, and was soon found actively engaged in the treatment of this scourging disease, and it is said was rewarded by seeing many recover under his skilful treatment and faithful care. On the breaking out of the war of the rebellion he offered his services to the government, and soon was actively engaged in duties in the various hospitals. He also spent three days attending to the sick and wounded on the field after the battle of Gettysburg.

I have not been able to gather any characteristics of Dr. Hartshorne as a practitioner of medicine. From his thorough acquaintance with the literature of his profession, and from the knowledge of the treatment of disease obtained from his connection with the hospitals, such as the Pennsylvania, the Episcopal, and the Philadelphia, we may feel assured that he was an intelligent and successful physician—without doubt he was a conscientious one. That he was a conservative in the treatment of disease, I have but to quote one of his addresses in which he speaks emphatically as follows: "For once I proclaim myself deliberately a conservative," and his definition of "true conservatism" no one will dispute—that it is "the

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holding fast to all that is good in the old, and to refuse nothing which is proven to be good in the new." Dr. Hartshorne's temperament and imagination led him to sympathize with the past in medicine, science, and philosophy, and with him Herbert Spencer, Tyndall, and Mills could not take the place of Hippocrates, Sir Isaac Newton, and Michael Faraday. He also estimated "more highly the practical services of a physician who could rightly determine by the pulse, skin, and countenance when to withhold and when to use, in a given case, beef-tea, quinine, and alcohol, than of one who had committed Virchow's and Niemeyer's works by heart, and who could enumerate and explain all the causes and forms of paralysis named by Brown-Séquard and Duchenne, of Boulogne." Dr. Hartshorne though, as already mentioned, not actively engaged in practice, was not idle, and in 1853, about five years after leaving the Pennsylvania Hospital, was elected Professor of the Institutes of Medicine in the Philadelphia College of Medicine. This position he held until 1858.

It was now just ten years since he left the Pennsylvania Hospital. He had crowded this decade of his life with much mental toil, and although he had inherited a vigorous mind and body, also a good stomach, without which, as has been written, no man ever achieved greatness, yet withal he succumbed to an overtaxed brain. He had in very early life the habit of reading late at night, and on one occasion he and an associate read together the *Noctes Ambrosianæ* until four in the morning, finishing up this literary symposium by demolishing a mince pie. Henry's mother for the time put a stop to these literary dissipations. His mind was most "forgetive" at night, and he was in the habit of commencing his studies after the family had retired, and then would work up to the small hours; and we might say that he taught his brain to do without sleep, and thus established a state of insomnia. Nervous prostration then followed, which necessitated the giving up of all mental work. He was then persuaded to go abroad, and with his wife Dr. Hartshorne sailed for Europe. He extended his tour to Egypt, and ascended the Nile as far as Thebes. He was absent about a year. The change and relaxation were highly beneficial to his health, and on his return home he soon began to fill many posts of honor.

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April 27, 1859, Dr. Hartshorne was elected to the chair of the Practice of Medicine in the Pennsylvania College, made vacant by the resignation of Dr. Alfred Stillé, and shortly after this he was appointed one of the Physicians to the Episcopal Hospital. He already held the position of Physician and Clinical Lecturer in the Philadelphia Hospital. He was prize essayist of the American Medical Association in 1856, the subject of his essay being the "Arterial Circulation." He was Vice-President of the American Health Association in 1858. He was elected a member of the American Philosophical Society in 1860. He was a member of the Academy of Natural Sciences and acted as Recorder of the Biological Section from 1857 to 1858. In 1862 he was elected Professor of Anatomy, Physiology, Natural History, and Hygiene in the Philadelphia Central High School, and in 1866 Professor of Hygiene in the University of Pennsylvania. In 1867 he was appointed Professor of Organic Science and Philosophy, and subsequently of Physiology and Hygiene, and Biblical Literature in Haverford College. His incumbency lasted nine years, and his resignation was received with regret. From the *History of Haverford College*, printed in 1891, I take the following: "The Faculty lost at the close of this year a valuable member in Dr. Hartshorne. . . . His broad culture and high attainments were universally recognized, while his smooth and elegant diction, and the calm serenity of his character were not lost upon his youthful hearers. He is without doubt the most voluminous, versatile, and varied writer who was ever a Haverford undergraduate."

This expression of praise from men of the highest intelligence and discrimination indicates that Dr. Hartshorne had reached a position of unusual distinction as a teacher and a scholar. The following reminiscence of Dr. Hartshorne was kindly furnished me by one who sat under his teachings:

"His instruction was by lecture; his diction was so lucid and clear that it was a pleasure to follow him with the pen. So serene was his disposition that students at times would take advantage of his good nature, but the Doctor would generally have the advantage in the end. On one occasion the entire class was in so hilarious a mood during the lecture hour that the Doctor merely refused to

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lecture again until he was petitioned to do so by the students *in toto*. Once again, several members of the class gained possession of the lecture-room for some time before the hour for the lecture, and smoked voluminously and rapidly as possible with long pipes. The Doctor arriving, they anticipated stupefaction upon his part, but not so; for the Doctor who walked quietly to his desk, ordered all the windows and doors closed, and the smoking to continue. The lecturer proceeded with his usual calmness while the leaders of the little plot gradually withdrew, ill at ease and stomach. He spoke most entertainingly of his student days at the college, and took pride in the feat he once performed of kicking a foot-ball over the building now known as Founders' Hall."

From Haverford College Dr. Hartshorne went to Union Springs, New York, as President of Howland Collegiate School. He was there two years, and then he returned to Philadelphia. Dr. Hartshorne while Professor at Haverford College was also lecturing on hygiene and the diseases of children, and afterward on physiology and hygiene in the Woman's Medical College; at one time he was Consulting Physician at the Woman's Hospital. During this time he was laboriously employed in writing manuals for students of medicine. His *Essentials of the Principles and Practice of Medicine* was published in 1867, and his *Conspectus* in 1869. He made frequent contributions to the medical journals, and many creditable publications, literary, scientific, and religious, emanated from his pen. I think we can justly and truthfully aver that few men of his time equalled, and none excelled, him in industry. There certainly was not much time spent in sitting "cross-legged." Pardon this homely expression, made classical to some of us by our late distinguished Leidy, who used it in answer to his intimate friend and associate, the late Dr. William Hunt, who inquired how he accomplished so much, and what method he adopted. Dr. Leidy's answer was:—"I have no particular method, only I do not often sit cross-legged," and we are sure neither Leidy nor Hartshorne needed to have written over their study doors, "*Cogenda mens est ut incipiat.*"

The Essentials of the Principles of Medicine and the *Conspectus of the Medical Sciences* were favorably received and passed through

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several editions. Of the former five editions were published, and over 25,000 copies were sold up to 1893. The late Dr. Condie, who reviewed this work, wrote "that it will be generally recognized as one of the best manuals for the use of students that has yet appeared. It bears the impress of a clear, logical mind, well instructed in the principles and practice of medicine, as well from an intimate acquaintance with the master spirits of our profession as from a sufficiently extended course of professional experience." I might add from my personal knowledge of Dr. Condie, that he was a learned physician and writer, and not one to give praise gratuitously.

Both of these manuals were translated into Japanese and published in Japan.

Dr. Hartshorne became a Fellow of the College of Physicians in 1851, and was a frequent contributor to its TRANSACTIONS. The most important communication is his essay on the treatment of pneumonia, in which he aims to show from statistics that under the present "working theory" the mortality of acute pneumonia, croupous and catarrhal, is decidedly greater now than forty years ago; and that this increase of mortality coincides with a prevailing change of treatment. The paper was ably discussed by the Fellows of the College. This essay was published in the TRANSACTIONS of 1888, and is most likely his last contribution to medicine. It was a work of labor and research, and written in his accustomed independent and emphatic manner. This all goes to show his great interest in medicine; indeed, no one has done more in the way he thought best for the advancement of medical science. He was well equipped for the teaching of medicine. His manner and style of lecturing have already been described. In his introductory and his valedictory addresses his endeavor was to stimulate his youthful hearers to high aspirations, to instil into them a reverence and, it might be said, a worshipful feeling, for the profession of their choice; and nothing shows more clearly his own estimate of the profession he had adopted with so much reluctance, than the standard of excellence he set before his students. The goal was so nearly unreachable that, while the industrious and ambitious may have been urged on, the faint-hearted, the laggard, and the irresponsible must have

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been appalled. Nor did he fail, while describing this eminence of perfection that few only can reach, to point out along with the essentials of knowledge, without which they dare not assume the responsibilities of their noble and exacting profession, the *sine qua non*, the crown of crowns, an unblemished character.

Dr. Hartshorne, while actively engaged in the function of medicine, found time to accumulate a mine of information in every department of science, and was well informed in literature and the classics. He had a mental aptitude for the abstract and had excellent powers of generalization. He made frequent contributions to the scientific journals, also to literary periodicals, and wrote religious essays for the *Friends' Review*. He was the editor of this paper from 1884 to 1893. His essay on the "Hypothesis of Evolution," which was written for Johnson's *Cyclopædia*, manifests a profound knowledge and grasp of his subject, and a most intimate acquaintance with the writings and labors of the master-workers in the field of science. The signification of this essay is the existence of a "superior intelligence," or that God created and rules over the world, *versus* the doctrine of an "unconscious intelligence," the view advanced by Laycock and others. It would be a pleasure to pursue this part of our theme still further, but I must leave the consideration of Dr. Hartshorne's relation to science to the pen of Dr. J. Cheston Morris, who will prepare a memoir of him for the American Philosophical Society.

Dr. Hartshorne was a great lover of nature, and had a fair field knowledge of natural history. An eminent botanist expressed to me his high opinion of Dr. Hartshorne's "broad-minded knowledge of vegetable physiology, morphology, and botanical science in general." With all this fund of information on science and medicine, Dr. Hartshorne made no discoveries, nor, as the term is understood, was he an original investigator. In the temple of Salomon he would have taken place, I should think, with the "Dowry men or Benefactors, whose function was to look into the experiments of their fellows, cast about how to draw out of them things of use and practice for man's life and knowledge."

It has been said of Dr. Hartshorne that had he concentrated his efforts more in one direction it would have been better for his

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reputation. "It is an uncontrollable truth," says Swift, "that no man ever made a bad figure who understood his own talents, nor a good one who mistook them," and just here is where Dr. Hartshorne most likely displayed wisdom. He early studied his disposition, and in maturer years he learned to know his talents, and thus was able not only to follow the path best suited to his abilities and his mental constitution, but to increase his usefulness. Dr. Hartshorne had also the gift of versification, and has left three volumes of sonnets and poems, and while I do not presume to be a Macaulay, who as one of the kings-at-arms versed in the laws of literary procedure, "could marshal him to the exact seat to which he is entitled," I am, perhaps, qualified sufficiently to say that though his poetry may not live through the ages, it will be difficult to procure better and more chaste verses. In his writings I have been struck with what graceful ease he passed from prose to verse when the tenderer emotions needed to be touched.

It is due to Dr. Hartshorne to say a word or two about the stand taken by him in the movement of educating women for the practice of medicine and placing them on an equal footing with men in the profession. In the discussions which the subject brought about, some bitter feelings were excited, not, however, on Dr. Hartshorne's part. He pursued his course in this matter with his accustomed serenity and amiable composure, yet steadfastly, and without wavering, as a champion of the woman's cause, and this even at the risk of suffering the "*odium medico chirurgicum.*" The manner in which he excuses his medical brethren to the graduating class of the Woman's Medical College is so characteristic that I will take the liberty to quote from his valedictory address of 1872: "I venture, ladies, to apologize to you, here, for some of my brethren of the medical profession of Philadelphia. Not only to you, but to themselves and their successors. . . . On what ground, it may be asked, can these medical men be excused, who have as yet maintained a wrong attitude on this question? . . . I know the medical profession of Philadelphia, and I believe that there is no body of men whose animus is more lofty or whose code is more disinterested and honorable. But they are not infallible in judgment; and their excuse for this error is conservatism."

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There yet remains a page of Dr. Hartshorne's life to fill up. I refer to his labors in Japan. He made two voyages to that country, with an interval of a year at his home in Germantown. The underlying stratum of Dr. Hartshorne's character was philanthropy and religion, and we might say that with him religion was a racial instinct. These elements of his character became more and more the leading motive as his years increased. He writes thus of himself: "In my later years, withdrawing from arduous professional work, I have been giving increased attention to the higher studies of philosophy and religion." Dr. Hartshorne had always taken a deep interest in missionary work, and his sympathies developed especially with regard to Japan, through the translation of two of his medical works. In an address delivered at a reception of Japanese physicians at Tokyo, he says that what he had read and heard of the beauties of the country of Japan, of its ancient fine arts, and its wonderful progress in modern enterprise, had given him a strong desire to visit it; "I have wished," he said, "in coming to this country where very many of whose people have not yet had an opportunity to be made acquainted with Christianity, to add my humble testimony to that of others to the reality of its truth. Of all the things the Western world has to offer for the acceptance of Japan, the most worthy is our Christian religion."

Dr. Hartshorne soon became identified with every philanthropic and religious undertaking, and from his high intellectual attainments and his thorough preparedness, he became a leader and a valued adviser on all occasions. His genial and kindly disposition soon won for him the hearts of the people, and his numerous acts of kindness created a filial affection toward him. One of his last acts of kindness was helping a Japanese student to prepare for his degree in medicine. A young missionary writes: "A soul more gentle than his, or more earnest, I never knew." "His whole life seemed wrapped up in the salvation of Japan, and every Christian and philanthropic work of public interest found in him a warm friend." He also published pamphlets and articles of vital interest to Christianity in Japan. He took an active part in the movement to prohibit the use of opium in Formosa, and was deeply interested in the establishment of a hospital for the insane, and withal he was

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keeping up an active correspondence with those friends in America who were interested in the work going on in Japan. A year before he made his second voyage to Japan, Dr. Hartshorne felt that he most likely would never return to his home, and prepared his daughter's mind for the probability of his dying in Japan. At this time he wrote a poem expressive of his desire to be buried in Aoyama, the two last lines of which read as follows:

> "When on this earth I make my last remove,
> Be it to Aoyama, Hill of Love."

With the same serenity and courage as he had lived, so he died. He neither sought death, nor did he fear it. It was to him as one of the ordinary events of his life, and he "crossed the line" as one would step over the boundary of adjacent countries. His funeral "was marked by a very impressive simplicity and repose." The meeting-house where it was held was filled with friends, Japanese and foreign, old and young, missionaries and merchants, teachers and students. "The commingling of so many different kinds of people gave evidence of the wide circle of the deceased's acquaintanceship and influence." From a letter written by a young missionary to the American *Friend*, I take the following: "A good Japanese woman, when she heard of his death, said, if Dr. Hartshorne had done nothing more for Japan than to come here to die, he had done a great work for the country, for which the people should be thankful."

During the process of preparing this sketch I was impressed with some unusually marked and peculiar features of Dr. Hartshorne's character. It has already been mentioned that the underlying stratum, the bed-rock of his character was religion and philanthropy, and these I have been led to believe constituted the leading motives of his life. He was a man of strong convictions. Under their powerful influence, beliefs, which to some men were mere matters of opinion, became to him mathematical demonstrations as indisputable as that two and two make four. One who was most intimate with Dr. Hartshorne said to me in conversation, that he seemed unable to appreciate anyone differing with him in opinion, and, again, that he was the most amiably obstinate man he had

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ever known. If the above view which I have given of him be a true one, it may serve to explain these remarkable traits. A man may change his opinions, but not so easily give up his convictions, and if Dr. Hartshorne's opinions "amounted to convictions," we have a reason for his apparent obstinacy.

United with this immobility and impenetrability was a nature most docile, retiring, and unassuming, with an unusually gentle disposition. He was honest in purpose and kind and pure in heart, with not a drop of bitterness in his constitution; no word of censure ever fell from his lips, nor emanated from his pen, and he found his greatest happiness in doing good to others. His humanity knew no bounds; it extended from his Western home to the Islands of the Orient, and there is something of the sublime in the manner in which Dr. Hartshorne rounded out his life of great usefulness, and was laid to rest in the land of his adoption.

HIS WRITINGS, MEDICAL AND SCIENTIFIC.

Water *versus* Hydropathy—Graduating Thesis.

Monograph on Glycerin and its Uses.

Facts and Conclusions upon Cholera.

Memoranda Medica.

Essay on the Arterial Circulation. Prize Essay of the American Medical Association for 1856.

Essentials of the Principles and Practice of Medicine, 1867.

Conspectus of the Medical Sciences, 1869.

Sir Thomas Watson's Lectures on the Practice of Medicine. Edited by Dr. Henry Hartshorne.

Papers and Communications to the Transactions of the College of Physicians of Philadelphia.

Papers in American Naturalist

On Organic Physics. Proceedings of American Philosophical Society.

On the Relation Between Vigor and Sex. In the Proceedings of the American Association for the Advancement of Science.

Paper on What to do Against Yellow Fever. For the American Public Health Association, 1873.

Important Articles in Johnson's New Illustrated Cyclopedia. On Anatomy, Philosophy, Brain, Breast, Chest, Circulation of the Blood, Deaf Mutes, and Evolution.

On Some Disputed Points in Physiological Optics.

On the Theory of Erect Vision with Inverted Images.

On Extuition as a New Term in Physiology.

On Ocular Color Spectra and their Causation.

On Animal Decomposition as the Chief Cause of Cholera. Medical Examiner, August, 1855.

Valedictory to the Graduating Class of the Philadelphia College.

Introductory Lecture on Medical Education. Delivered at the Philadelphia College of Medicine, 1857.

Medical Record for Private Medical Statistics. Prepared under the sanction of the Medical Society of the State of Pennsylvania and of the Biological Department of the Philadelphia Academy of Natural Sciences, 1859.

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Memoranda Medica. 1860.

A Discourse on Speculative and Inductive Medicine, being the introductory lecture delivered in the Medical Department of Pennsylvania College.

Valedictory Address to the Twentieth Graduating Class of the Woman's Medical College of Pennsylvania, on Some Disputed Points in Physiological Optics.

Medical Ethics. Medical News, Philadelphia, 1886.

Memoir of E. Hartshorne.

Cholera and Its Migrations. Medical News, 1892.

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

VOL. II., 1846–49, p. 297. Note of the neat duodecimo of Dr. Henry Hartshorne entitled Water *versus* Hydropathy.

VOL. I., N. S., 1850–53, p. 115. Rupture of the Gall-bladder. Presented by Dr. H. Hartshorne.

VOL. II., N. S., 1853–56, pp. 331–334, On Influence of Ether on Nervous System; p. 264, Cholera on Board Ship Tonawanda; pp. 342–351, On Meningitis; p. 412, Effects of Copper Boilers on Contained Water; pp. 441–445, Mode of Treating Fracture of the Thigh.

VOL. III., N. S., 1856–62, p. 142, Enlargement of the Thymus Gland; pp. 222, 249, Apparatus for Fracture of the Thigh; p. 339, Case of Cold-stroke; p. 400, Ring Pessaries.

VOL. IX., 3d S., 1887, p. cdxxv. Memoir of Dr. Edward Hartshorne; p. ccclxxxvii. The Old and the New Physic.

VOL. X., 3d S., 1888, pp. 151, 189, Inquiry Concerning the Mortality and Treatment of Pneumonia.

VOL. XII., 3d S, 1890, p. 152, Remarks on Contraction of the Heart.

VOL. XIII., 3d S., 1891, p. 110. [Three lines in a discussion on the Microscopical Anatomy of the Human Heart.] Paper read by Dr. A. V. Meigs.

HIS LITERARY WORKS.

Woman's Witchcraft, or the Curse of Coquetry, 1854.

Summer Songs, 1865.

Contributions to Literary Magazines.

Brief Essays on Religious Subjects.

Bertram, the Prince: an Idyl.

A Bundle of Sonnets.

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THE LATE PROFESSOR WORMLEY.

By JOHN ASHHURST, Jr., M.D.

[Read November 3, 1897.]

On the west bank of the beautiful Susquehanna, in a small village named after his progenitors, and amid the fertile meadows of Cumberland County, Pennsylvania, my valued friend and colleague, Theodore George Wormley, drew his earliest breath on the first day of April, 1826. His parents were David and Isabella Wormley, and in Wormleysburg and in the surrounding country the years of his childhood were spent, cared for by his mother, for his father died when he was little more than an infant. Of Dutch origin, his ancestors coming to this country about the middle of the last century, we may, perhaps, trace to hereditary influences that extreme accuracy and precision, characteristic of the Teutonic mind, which marked our friend's character throughout his whole career.

Removing from his native village to Carlisle, the capital town of Cumberland County, we find young Wormley in 1842, at the age of sixteen, registered in the Preparatory Department of Dickinson College, and entering two years subsequently the Freshman class of the same institution, in which he took two full courses, and in his third, or Junior year, a partial course, beginning at the same time the study of medicine, which, as was customary in those days, he pursued for a year in the office of his preceptor, Dr. John J. Myers. Migrating to this city at the end of his preliminary year, he attended the lectures of the Philadelphia College of Medicine, a reputable school no longer in existence, but at that time occupying quarters in Fifth Street below Walnut. From this institution he

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received the degree of Doctor of Medicine in 1849, and returning to Carlisle spent there another year before following the Star of Empire to what was then looked upon as "The West"—though now but an easy day's journey from our own city—and, after a short stay in Chillicothe, establishing himself in 1850 in Columbus, the capital of Ohio, where he was destined to remain twenty-seven years and to acquire by incessant labor and study that exalted position which he came to occupy among American chemists.

At first Dr. Wormley appears to have intended to engage in the ordinary work of a physician, but when the opportunities were offered him—and they were not long lacking—to pursue the scientific studies to which he was more forcibly attracted, he gradually abandoned the duties of the practitioner, and became known as an original investigator, as a writer, and as a most successful teacher of chemistry.

A lover of nature from his earliest boyhood, Dr. Wormley had always spent much time in the country, collecting and studying objects of natural history of all varieties. He was particularly interested in ornithology and ichthyology, and while living in Ohio had the good fortune to discover a previously undescribed species of fish, of brilliant coloring, to which he gave the name of Etheostoma Iris. While his fondness for chemistry appears to have been stimulated by his intercourse, during his college career, with Dr. William H. Allen, then Professor of Chemistry in Dickinson, but afterward President of Girard College, his intimacy with another of his teachers, the late Professor Baird, also a member of the Dickinson Faculty, and subsequently Director of the Smithsonian Institution at Washington, served to further encourage his zeal for natural science, and among the Smithsonian collections at this day are numerous specimens of the snakes found in the northern and western portions of Pennsylvania, gathered and classified by teacher and pupil in their wanderings through that region.

While much the greater portion of his life was devoted to chemistry—and surely modern chemistry is a large enough science to demand even the exclusive attention of ordinary men who make it their vocation—Dr. Wormley found the time to become an accom-

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plished microscopist, and not only cultivated microscopy in its relations to crystallography and micro-chemistry, but in company with a close friend in his Columbus home, the late William S. Sullivant, an eminent botanist, bestowed much time upon the study of infusorial earths and diatoms.

Chemistry, however, was the branch of science in which Dr. Wormley's energies were mainly and most successfully to be exerted, and as early as 1852, when but twenty-six years old, he became Professor of Chemistry and Natural Science in the Capitol University of Columbus, and two years afterward Professor of Chemistry and Toxicology in the Starling Medical College of the same city. The duties of both these chairs were conscientiously discharged by Prof. Wormley for eleven years, at the end of which time he resigned the former position, retaining his chair in Starling Medical College until his removal to Philadelphia, in 1877. During this quarter of a century, spent in the study and teaching of his chosen branch in the capital city of Ohio, Dr. Wormley acquired a reputation as a chemist, not merely local nor even national, but world-wide. Other appointments which he filled, with great advantage to the community and the State, were those of State Gas Commissioner of Ohio for eight years (1867–1875), and Chemist of the Geological Survey of Ohio for five years (1869–1874). During the war he served on a relief commission to provide stores and surgical assistance for our armies in the field.

During this period of his life, also, Dr. Wormley contributed numerous articles, embodying the results of original research, to the pages of the *Chemical News* and the *American Journal of Pharmacy*, and published the first edition of his *magnum opus*, "The Micro-chemistry of Poisons," a second edition of which was called for not many years before his death. A charming chapter of the romance of science narrates that when this work was ready for the press, the publishers averred that they could find no draughtsman or engraver capable of producing the exquisitely fine illustrations by which it was to be accompanied, and that, as no professional artist was found equal to the task, the author's devoted wife herself learned the art of steel-engraving, and, copying directly from the field of the microscope, supplied the deficiency. Similar aid

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in the preparation of the second edition of his work was given by Dr. Wormley's elder daughter, Mrs. John Marshall.

In 1874 Dr. Wormley was one of the Vice-Presidents of the "Centennial of Chemistry," celebrated in that year in Northumberland County, Pennsylvania, at the former home of the eminent English chemist, Joseph Priestley, whose discovery of oxygen-gas had been made on August 1, one hundred years before; and in 1876 he delivered the address on Medical Chemistry and Toxicology before the International Medical Congress held in this city in commemoration of our country's Centennial of National Independence.

In the spring of 1877 the affairs of the Medical Department of the University of Pennsylvania had come to occupy a critical position: Dr. Joseph Carson, the senior member of the Faculty, and for many years the best known in those parts of our country from which the majority of its students were drawn, had resigned a year before, oppressed by ill-health and the burdens of advancing age, and had recently died; Dr. Francis Gurney Smith and Dr. John Neill had also resigned under the pressure of failing health; new plans and new methods were being inaugurated, which at that time were looked upon somewhat askance by many of the older alumni and friends of the school; and Dr. Robert E. Rogers, long the Professor of Chemistry, believing, no doubt, that he was escaping from a sinking ship while there was yet time, had likewise sent in his resignation, abandoning his post in order to accept a similar position in a sister institution. For the chemical chair thus made vacant, Dr. Wormley was nominated, his most formidable competitor being the late Dr. John J. Reese, of this city. The election took place on the first Tuesday, the fifth day, of June, and in a meeting at which nineteen Trustees out of twenty-four were present, Dr. Wormley was chosen on the second ballot by a majority of one. Having accepted his election, he removed to Philadelphia in the ensuing autumn, and from that time until his death, nearly twenty years, his time and energies, with all the powers of his mind, were untiringly and unswervingly devoted to the promotion of the University's interests and to the maintenance of its chemical

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department, both in its didactic teaching and in its laboratory work, at the highest point of efficiency.

Dr. Wormley became a Fellow of this College in January, 1878, and, though never taking a very active part in its proceedings, was always a loyal member of our body, interested in its welfare and glad to assist in its advancement. He was also a member of the American Philosophical Society, a member and Vice-President of the American Chemical Society, a member of the American Metrological Society, a corresponding member of the New York Medico-Legal Society, and a Fellow of the American Association for the Advancement of Science, and of the Chemical Society of London. He received the honorary degree of Doctor of Philosophy from both Dickinson College and Pennsylvania College (Gettysburg), and that of Doctor of Laws from Marietta College, Ohio.

My personal acquaintance with Dr. Wormley began in the autumn of 1876, and was continued by correspondence in relation to his address on Medical Chemistry and Toxicology, which was delivered before the Centennial Medical Congress held in that year, and which came into my hands as Editor of the Transactions of that body; and it may be mentioned, as an illustration of the extreme care and accuracy which marked all of Dr. Wormley's work, that his manuscript was one of the few—four or five—out of more than eighty, which it was found safe to entrust to the printer without more or less extensive previous editorial revision. We were elected to the Medical Faculty of the University of Pennsylvania on the same day (June 5, 1877), and this circumstance, to which he often alluded, seemed to form a bond between us which led to a friendship, highly prized on my part, and I believe also on his, which but increased in depth and firmness as we knew each other better and as successive years passed over our heads.

Dr. Wormley was happy in his private life. The hours which were not claimed by his lecture-room and laboratory were devoted to the society of his loving wife, a daughter of John L. Gill, of Columbus, Ohio, and of two daughters—one the wife of his chosen assistant and successor, Dr. John Marshall, and the other, named after himself—Theodora—in whose well-known and

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remarkable musical ability he took great pride and pleasure. Indeed, Dr. Wormley was himself no mean musician, and in his early life had been a performer on the flute, bugle, French horn, and other wind instruments, and often amused himself by arranging and transcribing the score for concerted pieces which he played in association with friends of similar musical proclivities. But it was not ordinary music which attracted him, and for what the rest of us would call a pretty tune, or even a lovely melody, he invariably manifested a somewhat grim contempt. It was

"From Harmony, from heavenly Harmony,"

that his enjoyment of music was derived; and, in truth, there can be no question that this, which may be called the scientific, or even the mathematical element of the Cecilian art, appeals to a higher grade of intellectual appreciativeness than its more popular rival.

Until his last illness Dr. Wormley enjoyed uncommonly good health. Almost never missing an engagement with his classes, he walked daily from his home to the University and back again, seldom even wearing an overcoat unless in extremely cold weather. The summer of 1896 he spent as usual mainly at his son-in-law's farm, in Berks County, Pennsylvania, where he thoroughly enjoyed the country life, working among the plants and flowers as he had done in his Cumberland County home when a boy. Returning in the autumn, he resumed his lectures with his accustomed punctuality, but ere many weeks had passed was forced to call upon Prof. Marshall to relieve him, and from that time almost constantly kept his room, suffering from excessive gastric irritability, with anorexia and other symptoms which he was disposed to consider as the effects of cold, but which the sequel showed to have been due to a chronic but insidious form of Bright's disease. Dr. Wormley was faithfully attended during this period by Dr. James Tyson and Dr. J. H. Musser, and it was my privilege to be associated with those gentlemen in caring for my friend during the last week of his life. I shall never forget the perfect patience and philosophic calmness with which he bore the distressing incidents of his illness. The end came quietly in the early morning of Sunday, January 3, 1897, and our friend's bodily frame rested in the stillness of death, while

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his immortal spirit passed from the tasks and toils of this life to the rewards and joys of that which is eternal.

The funeral services, largely attended by professional and personal friends, and by pupils past and present, were held on Wednesday, January 6, in the Second Presbyterian Church, at the corner of Twenty-first and Walnut Streets, in which Dr. Wormley had for many years been a worshipper and a Trustee, where a most impressive discourse was pronounced by his long-time friend and pastor, the Rev. Dr. Mackintosh. The interment took place in Woodlands Cemetery.

It remains to speak briefly of Dr. Wormley as a chemist, an author, a teacher, and a man.

As a *chemist*, Dr. Wormley was noted for the care and precision with which his work was done, every step, even the minutest, in the most complicated processes being watched with an untiring vigilance which was quick to detect the slightest possibility of error. I do not, indeed, feel myself qualified to speak on this subject from personal knowledge, but the accepted opinion among his compeers in chemical science has been well expressed by a competent critic, Prof. Edgar F. Smith, as follows: "A marked characteristic of all work done by Professor Wormley is its extreme accuracy. In searching for the truth, time and labor ceased with him to be factors. Repetition was practised to an almost painful degree. Every subject was studied from all possible points of view, so that in his special field it is not in the least surprising that he was early recognized as an authority and expert."

That branch of practical chemistry which deals mainly with the analysis of mineral waters, laxative or other, of infant foods, and of proprietary preparations of all kinds, though doubtless presenting attractions not to be despised, seems to have possessed little charm for Dr. Wormley. Rather was he drawn to the study of poisons, the modes of their detection in, and separation from, the fluids and organs of the body, and the multifarious accidents and fallacies which might render a test for suspected poison incomplete or erroneous; and his skill and scrupulous exactness in this branch of his profession gave him a commanding reputation as a

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toxicologist, and caused his assistance to be widely sought as an expert witness in cases in which poisoning was alleged to have been practised. Indeed, so carefully were his conclusions formed, and so unassumingly and at the same time so clearly and distinctly were they expressed when he was upon the witness stand, that it is said that during the later years of his residence in Columbus there were few trials of importance occurring in that vicinity in which questions of poisoning were involved, in which his services were not invoked. After his removal to Philadelphia Dr. Wormley did little in this way; mainly, no doubt, because, as he once told me, he thought it right to give all his time to his duties at the University, but partly also, I suspect, from that feeling which, as we pass middle life, comes, I think, to most physicians as it does to so many eminent lawyers, one of indisposition to be associated with the practice of the criminal courts: a feeling that while, of course, murderers ought to be hung and hung promptly, yet upon the whole we should prefer not to be concerned, even indirectly, in the business of hanging them.

As an *author*, Dr. Wormley's work was characterized by the same extreme care and accuracy which marked his analyses. He looked upon the printed page as a means for setting forth facts—and facts were what he dealt with. If I might be permitted to venture any criticism upon his literary productions, I would say that had his facts been less undiluted, and his style a little less severe, his writings would have had more attraction for the general reader. I have already spoken of his principal publication, but cannot resist quoting what is said of it by Prof. Smith, whose opinion is much more valuable than mine: "The lasting monument which he raised to science and his own glory is his grand work, entitled 'Micro-chemistry of Poisons.' In it are embodied the records of thousands of the most painstaking observations. The patience displayed in the preparation of this volume of world-wide reputation—the recognized authority in all lands—is marvellous."

As a *teacher*, Dr. Wormley was eminently and deservedly successful. Some students there were—of the same class as that which finds surgery so large a branch as to be oppressive, and which regards modern medicine with its instruments of precision and its

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improved methods of diagnosis as unnecessarily complicated—who complained that Dr. Wormley taught them too much chemistry; and yet at the end of the session it was commonly found that these individuals had acquired but a very modest acquaintance with the subject. The best students appreciated his teaching, and many successful practitioners throughout our country now look back gratefully on the profitable hours spent in Dr. Wormley's laboratory and lecture-room. It was an ordinary comment that while some chemical lecturers could entertain and amuse a class for a whole hour without teaching it anything, Dr. Wormley, with no attempt at poetical style or eloquence, never failed to supply his hearers with as much mental pabulum as they could possibly assimilate. Dr. Wormley was noted for his punctuality. I have been told that some medical professors have been known to come habitually to their lectures ten or fifteen minutes after the time appointed, and then, like Charles Lamb at the India House, make up for their tardiness by leaving correspondingly early; but Dr. Wormley did not follow this method. To use his own words, he always began at the designated hour, and did not stop till the bell rang.

As a *man*, Dr. Wormley's character was marked by honesty, sincerity, modesty, and strict and unflinching adherence to truth and right. It is often said that a man may be known by his friends, and tried by this test Dr. Wormley's sterling qualities may be fairly estimated. His association with Spencer Baird and with William Sullivant has already been referred to, and among his intimates and friends during the years of his earlier manhood may be specially mentioned Presidents Hayes and Garfield, with some much older than himself, such as Mr. Justice Swayne, of the Supreme Court, and Hon. Salmon P. Chase, Secretary of the Treasury and afterward Chief Justice of the United States. Dr. Wormley's rooms in Starling Medical College were the resort of many men eminent in science and history, and it is interesting to record that to a brilliant description by the Hon. S. S. Cox of the light of the setting sun as seen upon St. Francis's Hospital, a portion of this building, was due the nickname which clung to that gentleman through life, and caused him to be everywhere known as "Sunset" Cox.

Few persons now living can claim to have been intimate with

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Dr. Wormley in the ordinary sense of that term. Indeed, I have never known a man more self-contained and less expansive—less disposed to talk about himself and his own feelings—than him of whom I write. Of his chair and collegiate work, of the progress and prospects of the University, and of any question which prominently occupied the attention of the profession at the time, he was always ready to converse freely and with perfect candor. But he never, to use a familiar expression, "wore his heart on his sleeve;" and any knowledge of the innermost workings of his mind, or of the motives of his soul, which his friends possessed, came to them as momentary and, as it were, accidental glimpses, and never as voluntary revelations.

As a member of the Medical Faculty of the University, Dr. Wormley was greatly respected and highly esteemed by all his colleagues. Ever punctual, ever patient, always cheerful and courteous, tenacious indeed of his own rights, but never oblivious of the rights of others—

Justum et tenacem propositi virum—

Everyone knew where he would be found in the discussion of any question of doubtful advisability; and his vote could always be counted on for the side of prudent advance, guarded by progressive conservatism. My own feeling toward Dr. Wormley was much more than respect and esteem: I loved him; and by his removal from a circle which, alas, is yearly narrowing, I recognize a distinct sense of personal privation and loss.

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ANNUAL ADDRESS OF THE PRESIDENT.

By J. M. DaCOSTA, M.D., L.L.D.

[Read December 1, 1897.]

In addressing you on this occasion I shall follow the plan of previous addresses I have had the honor of delivering from this Chair, and, after reviewing the prominent occurrences of the year, shall mention some matters that our needs require.

The scientific activity of the College has been very marked; we have had a large number of papers presented at the sections, while the regular stated meetings have not fallen off in the value of the contributions, or the debates in interest. There has been so much material brought forward that it would have been impossible for the College, as a whole, to manage it, and the sections have proved themselves indispensable as fields for the working spirit of the College and in preventing the stated meetings from being overcrowded. To the previously-existing sections, one on general medicine has this year been added, and has already made a record in activity, placing it alongside those of older date. Once more let the regret be expressed that financial reasons forbid our gathering all the rich material of the sections into an annual volume. Perhaps in the near future this may be accomplished by publishing, with the papers of the general meetings, such papers from each section as its Executive Committee judges best to transmit to the Publication Committee of the College.

The library continues to grow in a very gratifying manner, and is increasingly used by the Fellows. It contains over 54,000 volumes, exclusive of duplicates, and nearly 34,000 unbound pamphlets, reports, and transactions. It remains, with the exception of

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the Library of the Surgeon-General's office in Washington, the largest and choicest medical library on this continent, taking rank with the great medical libraries of the world. It must be our endeavor to keep it in this position. Just now its greatest need is the lack of stacks and shelving. This is so urgent that without them a large number of the books are not accessible. I believe the effort should be made to remedy the matter at once, and, if the College add a similar amount for the coming year to the appropriation ordered last year, we shall have about half the sum required on hand. Let us at once try to raise the balance by private subscriptions among the Fellows of the College, as the need for action is great.

Considerable additions have been made to the Mütter Museum during the last year, and the collection of instruments, started only a short time since by a few of us, has grown rapidly, proving how soon, in institutions, concerted action will produce beneficial results. The main additions this year have been the gift of Mrs. Wm. H. Pancoast, consisting of fully a thousand surgical instruments belonging to the late Professors Joseph Pancoast and Wm. H. Pancoast. It is very gratifying to note the steadily-increasing use authors preparing monographs are making of the rich material contained in the museum ; and lectures and demonstrations, highly lauded and appreciated, were given within its walls by three of our Fellows, J. B. Roberts, Oscar H. Allis, and Guy Hinsdale.

The committees continue to do their work with great zeal and judgment. The Committee on the Directory for Nurses has, as in previous years, given to the College a very large portion of its receipts, and the Hall Committee has rented the rooms in the college building for occasional use to such advantage that it has returned three hundred dollars to the funds of the College. The building itself is in good order ; its entire outside has been repainted, and the appearance of the library has been much improved by the recovering of its floor.

Twenty-eight members have been added to our Society, a larger number than in any previous year. I am glad that it is so. We are even now only 322, and we could with great advantage to the profession as well as to ourselves augment our number to 400.

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There are still many men in the medical community deserving of being Fellows, and while great good would be accomplished by extending the admirable influence of the College through the profession, we ourselves would profit in all our undertakings by a larger membership, and many of our present difficulties would be greatly lightened.

As an immediate means of accomplishing this, an increase in the annual dues has been mooted. This would unquestionably strengthen us materially, and it might be well for the College to consider it; but I doubt if the times are propitious for a change which might become irksome to a number. Something may be accomplished by insuring a prompter collection of the dues through the alteration proposed by the Finance Committee and recommended by the Council. I would also suggest, with the view of increasing our permanent fund, that the initiation fee be raised from $25 to $30, all such fees to go, as now, to the permanent fund.

The Secretary reports that the edition of the Ordinances and By-Laws is almost exhausted, and will have to be shortly reprinted. Before so doing, I think they ought to be revised. There is considerable in them that is simply a matter of ordinary parliamentary law, and needless, or contrary to ordinary practice. There are some palpable omissions; there are verbal obscurities and inaccuracies; and there are some most obvious changes needed—for example, restricting the December meeting to a purely business meeting. While no radical alteration is desirable or to be aimed at, the By-Laws might be advantageously abridged and amended, and with this view I recommend the appointment of a committee for their revision before the new edition goes to press. The labors of the committee could be judged by the College in a single meeting devoted to the purpose, or be first examined and reported on by the Council.

The average attendance at the meetings has been fifty-two. Twenty-two papers have been read at the general meetings, including those presented at the February meeting set apart for the discussion on "The Relation of Nervous Disorders in Women to Pelvic Disease," which attracted much attention.

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The social feature of our College year has been the dinner given by the Weir Mitchell Fund, which was served in the main hall of the College, and thoroughly enjoyed by the large number of Fellows that participated.

Death has taken from us eight Fellows: Theodore G. Wormley, William H. Pancoast, William A. Carey, Henry Hartshorne, Anthony E. Stocker, William H. Ford, George H. Horn, and Harrison Allen; and two Associate Fellows: Traill Green and William T. Lusk.

Wormley's career has been so recently laid before you by our Vice-President that we shall do no more here than record the sorrow we all feel that this man of untiring devotion to a high ideal, this great teacher, this eminent authority in chemistry and toxicology, is no longer with us. And of Henry Hartshorne's student life James Darrach has given us the clear description that brings him vividly before us as the learned professor, the indefatigable writer, the man of literary ability and of earnest convictions. William H. Pancoast inherited the love of surgery from his famous father, and practised it to the last, notwithstanding the warnings of failing health, which shook even his splendid physique. He was in medical colleges all his life, and his personal popularity among the students was unsurpassed, scarcely equalled, by any teacher. From 1874 to 1886 he was Professor of Anatomy in the Jefferson Medical College, and from 1886 to the day of his death, Professor of Anatomy and of Clinical Surgery in the Medico-Chirurgical College. He became a Fellow of this College in 1864.

William Anthony Carey died too early to be extensively known in the profession. He was a hard-working physician and an assistant at the Gynecological Clinic of the University of Pennsylvania. He became a Fellow in 1895.

Anthony E. Stocker was a Brigade-Surgeon in the United States Army during the Civil War, and remained much interested in army matters. He was for many years connected with the Institution for the Instruction of the Blind. He was one of the oldest Fellows of the College, having been elected in 1846. In the last years of his life he lived in retirement.

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William H. Ford's life is a continuous record of steady, useful work for the general good. An accomplished sanitarian, a man of spotless character, he labored without reward in the purest spirit of philanthropy for the common benefit. Philadelphia has lost in this quiet, modest citizen, the President of its Board of Health, one whose memory she cannot hold in too high honor ; and we, his associates, can point to him as one more example of the self-sacrificing public-minded physician.

George H. Horn was elected a Fellow of this College in 1867, and, though rarely with us, was one of whose attainments the College might well feel proud. At the time of his death he was the leading entomologist in America. In his early life he had been associated with another of our Fellows famous as an entomologist, Dr. John L. LeConte, and was, like him, one of the most active workers of the Academy of Natural Sciences. Dr. Horn was a member of many French, Russian, and other European learned societies. For many years he was Secretary and Librarian of the American Philosophical Society. Dr. Horn did not devote himself exclusively to natural science, but also practised medicine. He was an agreeable companion and a man of great modesty.

Harrison Allen has been so recently and so suddenly taken from our midst that it is hard to realize that he is no longer with us. Distinguished in many capacities—anatomist, biologist, anthropologist, laryngologist, a teacher of comparative anatomy and zoology, then of physiology, in the University, Director of the great Wistar Museum—he applied to everything he undertook the same thoroughness of method and thoughtful investigation. He was always greatly interested in this College and its work, frequently attended its meetings, and whenever he spoke was sure to say something instructive and valuable. As a member of the Committee on the Mütter Museum his profound knowledge of anatomy rendered him of great service.

Of our Associate Fellows, Traill Green and Lusk are the two we miss from our list. Traill Green was known personally to many Fellows of the College. A man of science, a Professor of Chemistry at Lafayette College at Easton, he was also engaged in

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the daily practice of his profession, and was Consulting Surgeon to St. Luke's Hospital at Bethlehem. His interest in all scientific matters led him to erect at his own expense an Astronomical Observatory, which he presented to Lafayette College. He retained his energies to the last of his eighty-four years, being occupied with professional work until past eighty. In 1876 he was elected an Associate Fellow of this College, and highly prized his connection with it.

William Thompson Lusk, the Professor of Obstetrics and Gynecology at Bellevue Hospital Medical College, had a worldwide reputation as a teacher and author. His work on the *The Science and Art of Midwifery* has been translated into many languages. He was a man of strong attachments and frank nature, and a leader in the medical life of New York.

The times through which we have passed have not been propitious for obtaining endowments for the College. It is thus an additional pleasure to announce a gift of six thousand dollars which Mr. Henry R. Hatfield has authorized me to state he will present for himself and brother in memory of their father, Dr. Nathan L. Hatfield. The interest of the fund is to be devoted to a triennial prize to be given to the author of the best essay on a subject in general medicine, and to the furtherance of original research. The cost of publication also is to be defrayed, so far as possible, by the income of the fund. There are a few other details which he leaves in my hands for adjustment, but nothing of a character to which the College cannot fully accede.

Another pleasant duty is it to announce that one who has been a steady benefactor to this College, Dr. Weir Mitchell, has just stated his intention to give very shortly a thousand dollars toward an Endowment Fund for the Library; the sum is to be added to the Weir Mitchell Library Fund.

This is the last term which our rules allow me to serve you as President. I retire from the office to which your good-will called me, indulging the hope that I have done my best with the high trust you placed in my hands, and that I shall transmit it to my successor as it was passed to me by my distinguished predecessor. I rejoice in the satisfactory condition in which the zeal and efforts

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of its Fellows have placed the College, especially in its scientific activities. For your uniform kindness and indulgence, for proofs of close comradeship that have made my official life among you an uninterrupted pleasure, I thank you warmly. To the last hour of my life I shall be keenly sensible of the honor of having been the President of this ancient and revered institution.

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RAPIDLY OCCURRING HEMIPLEGIA IN ACUTE LEAD-POISONING.

By J. M. DaCOSTA, M.D., LL.D.

[Read January 6, 1897.]

On November 10, 1896, I was asked by Dr. Theodore Gruel to see a case of paralysis of rapid onset and obscure origin. I found the patient to be a lady, thirty-five years of age, a brunette of fine physique, unable to walk, and scarcely able to stand without assistance. She had been still more helpless, but lately had been improving. Her previous history was one of almost uninterrupted health, the only illness being an attack of pneumonia four years ago, followed by albuminuria, from which she recovered on going to a Southern climate. She never complained of anything, but on questioning as regards susceptibilities, spoke of being susceptible to poison-vine. She spent the summer at the seashore and came back to her home in the best of health. Shortly after her return it was determined to paint some rooms in the house, though not the one in which she slept, and the house throughout became filled with the odor of fresh paint. She began, almost from the first day, to complain of headache, and three days after the painters had been at work the headache had become so violent and she felt so ill that she sent for her family physician, Dr. Gruel. He found her much worse than had been supposed. Her speech was thick; her tongue was slowly protruded and deviated to the right; there had been vomiting. The right arm and leg were much impaired in their motion, the leg more so than the arm, and this loss of power was preceded by a feeling of numbness. The right side soon became still more helpless, and the patient was forced to remain in bed. Shortly after the right side was affected, numbness and a sense of coldness on the left side were complained of; but there was never any motor weakness on that side. The sense of coldness and numbness on the left side yielded in about one week to alcohol-sponging and to frictions with a Turkish towel, and her general condition became decidedly better under repeated free purgation with sulphate of magnesia and under strychnine. In the progress of the case before I saw her it was observed that, while the paralysis of the right arm improved, things dropped out of her right hand; that the eyesight was

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very dim and its impairment much complained of; that there were no pains in the arms or legs, or joints, or in the abdomen; that the urine, examined from the start, was of high specific gravity, 1025 to 1040, but free from albumin and sugar; that the temperature was normal; and that there were no psychical disturbances, to which, indeed, neither she nor any of her family had ever been liable. The mother, it was ascertained, had a very great susceptibility to poisons of all kinds.

When I visited Mrs. O. with Dr. Gruel for the first time, four weeks after the paralytic attack, I found a well-nourished woman sitting in a chair, but still hemiplegic. The right arm could be feebly moved, but the grasp of the hand was very weak; the right leg was powerless. There was neither wrist-drop nor foot-drop, nor tremor, nor muscular atrophy. No facial paralysis existed, and the tongue was protruded straight. The knee-jerks were exaggerated, that on the right side markedly so. There was also an increased reflex in the forearm, both on tapping the flexors and extensors. In the course of the musculo-spiral, the radial, and the nerves in the legs no spots of tenderness were detected. There was no anæsthesia to touch or to pain. Tactile sensation in the fingers of both hands was well preserved, and heat was readily distinguished from cold. The muscular sense was not tested, nor were the electric reactions, though I learned subsequently from Dr. Gruel that the muscles of both sides responded well to faradization, and that the electric sensibility was normal. There was no disease of the heart. The breath had a peculiar mawkish odor, and, in a strong light, we found an undoubted bluish line on the gums, especially around the lower incisors on the left side.

Convinced that she was suffering from lead-paralysis, we placed her on iodide of potassium. The strychnine was stopped, the sulphate of magnesia continued as a laxative, and, after about a week of this treatment, the urine was sent by Dr. Gruel to Professor Fetterolf, of the University, for examination. The report returned says, "No albumin, but lead present."

On December 24th I saw Mrs. O. again, and learned from Dr. Gruel that her progress had been uninterrupted. There had been no return of headache; indeed, the headache had passed away a few days after the seizure. The grasp of the right hand was greatly improved, though it was still not so strong as that of the left. She could now play on the piano; not, however, as well with the right hand as with the left. The sensation to touch was good in both hands; the tactile sense, tested with sharp points, seemed perfect, and was as good in the right hand as in the left; there was no diminished temperature-sense in either hand. No disorder of sensation in the legs was discernible; the motion of the right leg was not quite restored; she still dragged it a little, but she walked unassisted, even with her eyes closed. The knee-jerks were good; they did not seem any longer exaggerated. A faint bluish discoloration was still noticeable on the gum of the lower jaw. The heart-sounds were distinct; the digestion was excellent; the eyesight

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was fully restored; indeed, her recovery was almost complete. She had been taking 30 to 45 grains of iodide of potassium daily since our first visit together. This we directed to be decreased and soon discontinued, and strychnine to be substituted. Systematic massage and faradization of the affected muscles were to be employed.

I am induced to put this case on record by its extreme rarity. As a rule, the publishing of isolated instances of disease is of little value; but here is one in which a woman in robust health is in three days so completely poisoned by lead that she becomes paralyzed. The form, too, of the paralysis is most unusual and its onset remarkable.

Let us first take notice of the rapidity of the poisoning. Almost from the first there is headache; after three days' exposure, paralysis, preceded by some disorder of sensation, but without colic or other abdominal symptoms except vomiting and moderate constipation. Three days is a very short time for any sign of lead-poisoning to manifest itself in, even the ordinary one of colic. Yet here we have the nervous system at once affected without preceding colic or any of the usual general symptoms of lead-poisoning. As regards the nervous system being disordered without colic first happening, the case, although unusual, is far from standing alone. In 102 cases analyzed by Tanquerel des Planches in his classical work, fourteen had not antecedent colic. It is true that the paralysis he means is for the most part the usual one of the extensors of the arms. Trousseau mentions an instance of lead paralysis in which there was no prior colic. In three of Tanquerel's[1] cases colic followed the paralysis. But in the rapidity with which the nervous system became involved, the case I have detailed is, I believe, without precedent; at least I am not able to find one. The most rapid cases I have any cognizance of are three alluded to by Tanquerel, in which, eight days after exposure to lead, paralysis followed; here, too, the context points to the ordinary local lead-palsy. In critically examining cases of rapid development we must not overlook the fact that a person may absorb lead slowly into the system for a long time, as through impregnated drinking-water or hair-

[1] Traité des Maladies de Plomb, t. ii. p. 19.

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dyes, and then another and different exposure, to fresh paint, for instance, produce sudden and overwhelming manifestations. This happened in the cases reported by Chapin,[1] in which acute symptoms of lead-poisoning showed themselves in the children of a painter after being only eight days in a freshly painted room, they having been, however, during two years exposed to a pot of white-lead kept in an adjoining room. In the case of Mrs. O. there was no history whatever of previous exposure, and, as already stated, she, with the rest of the family, returned from the seashore in perfect health.

The form of paralysis in the case under discussion requires special notice. It was that rarest of all as the result of lead—hemiplegia. Moreover, it was not attended, at least not when it came under my observation, with anæsthesia, though the hemiplegic form is generally associated with hemianæsthesia. Cases of hemiplegia from lead are spoken of by some of the older authors, as by Stoll and Andral; Tanquerel[2] mentions having met with one. Raymond[3] describes a case in a man thirty-six years of age. The extensor muscles were first affected, and the palsy was preceded by violent colic. With the hemiplegia there was anæsthesia. Oliver[4] refers to an instance of right hemiplegia with aphasia. Often what is described as hemiplegia from lead is not a true hemiplegia, but is a general paralysis of incomplete character, especially in the legs, in which the loss of power has almost entirely or entirely passed off on one side at the time the patient is first seen. In the hemiplegia, as well as in the paraplegia, from lead the muscles of the upper extremities are generally more affected than those of the lower. Jaccoud[5] tells us that this is the case in all lead-palsies in the proportion of 5 or 6 to 1. In children, however, as the observations of Putnam,[6] Sinkler,[7] and Newmark[8] prove, the palsy is more apt to be in the lower extremities. In this respect the instance of paralysis narrated in this paper is more like the lead-palsy of childhood than of adults.

[1] New York Medical Record, 1884.
[2] Op. cit.
[3] Gazette de Paris, No. 30, 1876.
[4] Med.-Chir. Trans., vol. lxxiii. 1890.
[5] Pathologie Interne.
[6] Article: Lead-poisoning in Cyclopædia of Diseases of Children, and Boston Medical and Surgical Journal, February, 1893.
[7] Medical News, July 28, 1894.
[8] Ibid., May 11, 1895.

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From an analysis of the features of this case, and of the few that I am able to find recorded in medical literature, the clinical picture of saturnine hemiplegia of acute form is that of a hemiplegia suddenly, or rather suddenly, developed, prodromes of headache and weakness of extensor muscles in arm and leg having existed or not. The hemiplegia deepens after its onset; there is with it anæsthesia or some other disorder of sensation on one or on both sides. But this is capricious and apt to pass off before the impaired motion does. The hemiplegia is associated with excessive reflexes. This combination of symptoms is in itself significant, and is valuable, irrespective of the history of the case and the ordinary manifestations of the presence of lead in the system.

From these hemiplegias of acute or subacute origin we must separate those that come on where the system has been long impregnated with lead, and secondary changes in bloodvessels, heart, kidneys, or brain have been slowly wrought. A hardened vessel gives way, and cerebral hemorrhage with one-sided paralysis occurs. Instances of this kind are mentioned by Mathieu and Malibran[1] and by Létienne.[2] Landowzy[3] details an autopsy on a printer who had right-sided hemiplegia and had frequently suffered from lead-colic. Besides the evidence of an old clot in the brain, a descending medullary sclerosis was found. In Monakow's[4] case, a printer, who had had chronic lead-poisoning for thirty-five years, a right-sided hemiplegia due to cerebral hemorrhage happened some months before death, and atrophic and sclerotic lesions existed in the upper part of the spinal cord. In Rosenthal's case[5] of right-sided hemiplegia in a house-painter an extravasation of blood on the left side of the brain, with rigidity of the arteries at the base, was observed at the autopsy. In the remarkable group of saturnine encephalopathies described by Berger,[6] to which Dr. Stewart called my attention, occurring in a family of potters, with an evident predisposition to nervous diseases and apoplectic seizures, there were four who, while suffering from chronic lead-poisoning, had hemiplegic attacks due, with one probable exception, to cerebral hemorrhage.

[1] Progrès Médicale, October, 1884.
[2] Arch. gén. de Méd., vol. i. 1892.
[3] Bull. Soc. Anat., 1877.
[4] Archiv f. Psychiat., vol. x, Part 2.
[5] Elektro-therapie, ii. Aufl. 32, Beob.; also referred to in Nervenkrankheiten, p. 607.
[6] Berlin. klin. Wochensch., March, 1874.

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There is little difficulty in distinguishing the hemiplegias due to lead from other palsies produced by lead. Most cases of paralysis from lead-poisoning, with or without the familiar wrist-drop, are owing to a degenerative neuritis, and the bilateral character of the palsy in the arms, its gradual spread, should it become general, the wasting of the muscles, the localized pains, the impairment or loss of faradic irritability, are very significant. The knee-jerks and plantar reflexes are usually much weakened or lost in extensive neuritis due to lead; yet too much stress cannot be laid on this point as a mark of distinction, for, as Hale White's[1] case proves, they may be very active. With reference to the hemiplegias that occur in chronic lead-poisoning yet are not, strictly speaking, saturnine, but due to cerebral hemorrhage, they may be discriminated by the history of long-continued lead-poisoning; by the signs of diseased arteries, heart, or kidneys, and by the sudden and complete loss of motion in the apoplectic attack—much more complete than occurs in saturnine hemiplegia. On the other hand, the disturbance of sensation is absent, or far less pronounced in the apoplectic cases. As a rule, too, the electro-muscular contractility is not so well preserved, owing to the saturation of the system with lead; but the electrical reactions are not conclusive in distinguishing between these forms of hemiplegia in lead-poisoning, nor are the reflexes. On the whole, the distinction is generally not difficult. Yet that it may be so is proved by an instance mentioned by Duchenne as occurring in Trousseau's clinic, which that master regarded as purely saturnine. There was normal electro-muscular contractility and sensibility, and at the autopsy an extensive clot was found on one side of the brain.

In the instances of paralysis of acute onset, such as the one described in this paper, it is not likely that any structural disease in the brain other than local alterations of the circulation and some effusion exists. The disturbance is caused by the lead circulating in the blood and acting on motor centres or motor paths as a poison, directly, or by changes produced in the blood, though the further thought of a thrombosis or of minute embolisms from the altered

[1] Transactions of the Clinical Society of London, 1893.

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blood suggests itself. We have no positive evidence in these hemiplegias that there is no anatomical change in the nervous textures; we can only reason from analogy from what has been observed in other encephalopathic affections of quick development that there is none. Thus, Oliver[1] extracted lead from the brain in cases of lead-poisoning in which death was rapid, but found the brain-substance pale, œdematous, and soft, with accumulation of subarachnoid fluid, and membranes normal, or the veins gorged. In Stewart's cases,[2] dying in convulsions, lead was found in the brain, but there were no marked signs of disease beyond those of congestion. Trimborne,[3] in a case resembling tubercular meningitis, found the brain to be intensely anæmic. The part of the brain for which lead has a particular affinity is indicated by the researches of Maier[4] to be the cortex.

This paper is offered as a contribution to a subject which, however ardently it has been worked at, still presents itself constantly in new or in complicated and rare forms.

DISCUSSION.

DR. H. A. HARE: I was unfortunate in not getting in in time to hear the beginning of the paper, and therefore do not know whether the author did or did not speak of cases of monoplegia, hysterical in character, or restricted his remarks to those due to lead. It is well to bear in mind that paralysis of one or more extremities, of rapid development, might be of hysterical origin even in cases exposed to lead. Another form may be mentioned, which was first emphasized by Dr. F. X. Dercum, one of our colleagues. In certain cases of nephritis it is not unusual to have developed a paralysis—usually a monoplegia, rarely a hemiplegia—for which no cause is found in the brain. These are cases of uræmic paralysis without cerebral lesion. I would ask the speaker if examination of the urine threw any light upon the case?

DR. HORACE Y. EVANS: I would merely mention the fact that I have seen three cases of lead palsy occurring in one row of houses which had been recently painted. I took the trouble to go and see the painter, who

[1] Med.-Chirurg. Transactions, vol. lxxiii. 1890.
[2] Phila. Med. Times, June and December, 1887, and January, 1889.
[3] Centralblatt f. klinische Medicin, March, 1891. [4] Virchow's Archiv, vol. xc.

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laughed at me and said that they did not use lead in this class of poor houses, but used zinc paint entirely.

DR. A. A. ESHNER: I would like to ask if it might not be possible in the case reported to have a combination of lead-poisoning with thrombosis or other interference with the circulation in the brain. The symptoms were peculiarly those of a cerebral lesion, as exemplified by headache, numbness, and tingling upon the right side, aphasia, unilateral loss of muscular power, non-interference with sensibility, and increased reflexes, particularly on the affected side of the body. Of course, the evidence of lead-poisoning is entirely undoubted, but it does seem to me very readily possible that there might be some vascular disturbance upon the left side of the brain giving rise to the symptoms which appeared upon the right side of the body.

DR. DERCUM: It occurs to me that possibly the rarity of lead hemiplegia, and perhaps of encephalopathy in general, may be explained by the method in which the lead is introduced into the system. In this instance it was by the respiratory tract. We know that mercurial poisoning by inhalation produces symptoms very different from those observed when the metal is taken by the alimentary tract. *Mercurial tremor* is not present, it must be remembered, save when the poison has been inhaled. A similar fact appears to be true in regard to arsenic. The symptoms of arsenical poisoning by inhalation appear to be quite different from those of arsenical poisoning by the mouth.

The case presented by Dr. Da Costa is certainly exceedingly interesting —as interesting as it is rare. In a hospital experience that has been unusually large I have seen but two cases of lead encephalopathy, and never one of lead hemiplegia.

While I do not, of course, regard Dr. Da Costa's case as one of hysteria, we should remember that metallic poisoning—including lead—is one of the recognized etiological factors of hysteria, as it is among the chief exciting causes of neuralgia.

DR. DA COSTA: In reply to the first question I would say that it is difficult to assume that the patient was hysterical, since she was a woman of unusual calmness of mind and had never shown any signs of hysteria. That a person of this kind should suddenly develop hysteria without cause in the course of a few days seems most unlikely. Moreover, there was the blue-line upon the gums, with lead in the urine; and even laying stress on the well-known fact that chronic lead-poisoning leads to hysteria, the time here is much too short for it to have produced such a result, with palsy.

In reply to the criticism that the case might have been one of uræmia, it is to be noted that there was lead in the urine, but that it was free from albumin. The case was examined specially from this point of view, and the urine was found to be normal at all times, except for the high specific

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gravity. Whether there was a cerebral lesion or not is more difficult to decide. The symptoms undoubtedly were in many respects like those of a thrombus, and possibly there was a small thrombus. But, as stated in the paper, in the encephalopathies of lead nothing but vascular disturbance has been found; and in the only case at all similar to this in which an autopsy is spoken of—the case mentioned by Oliver in the Medico-Chirurgical *Transactions* for 1890—no marked lesion was discovered. The cases of saturnine hemiplegia are, indeed, very rare, and those described as hemiplegia from lead in medical literature, to which reference has been made, are, for the most part, instances of neuritis or cerebral hemorrhage from degenerated vessels in chronic lead-poisoning.

DR. H. A. HARE: If I have permission, I would like to make one observation. I believe that the occurrence of a blue-line upon the gums is evidence of lead, but its absence is not now regarded as conclusive evidence that lead-poisoning is not present. Dr. Putnam has pointed out that it is due to a foulmouth and to the presence of sulphide of lead from the combination of lead with the products of decomposition of albuminoid articles of food which remain around the teeth. In the case reported it seems hardly possible that in so short a time as three days after exposure a blue-line should have formed as the result of the absorption of lead into the system.

DR. DERCUM: With regard to the presence of a blue-line upon the gums I would like to recall a case reported by myself to the College many years ago. The case was that of a lady who presented a mere trace of a blue-line in the neighborhood of the left lower canine tooth, but whose urine yielded an enormous quantity of lead. Dr. John Marshall obtained from 400 c.c. a metallic pellet weighing five and two-fifths milligrammes. This pellet is deposited in the museum.

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SOME IMPORTANT FACTS ABOUT CHLOROFORM.

By H. A. HARE, M.D.,
PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA.

[Read January 6, 1897.]

THE effect of chloroform upon the vital functions has been for many years a subject of hot dispute between various surgeons and pharmacologists. On the one hand has been the school originally led by Syme, of Edinburgh, which has asserted that death or danger from chloroform lay in failure of the respiration, and that this was the function to be watched while chloroform was being used; on the other hand, the so-called London school has asserted that death arose from cardiac failure, and that the pulse was the thing to be watched during the use of chloroform. The number of clinical and laboratory researches which have been carried out to determine which of these opinions was correct has been very great, both in England and in America, but it has only been within the last ten years that the greatest and most competent studies have been undertaken, of which the best known is the series made through the munificence of His Highness the Nizam of Hyderabad, in India, and known as the "Reports of the Hyderabad Chloroform Commissions, Nos. 1 and 2." The conclusions of the first commission having been criticised adversely because it is asserted that the cause of death was respiratory failure, a second commission was formed, and, under a grant of $5000 from the Nizam, Dr. T. Lauder Brunton, of London, was sent out to direct the second investigation. Although a teacher of the theory of death from chloroform being a cardiac death, this gentleman returned to England converted to the idea that the cause of most of

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the fatal accidents under this drug was respiratory failure, and the conclusions of Commission No. 2 were once more criticised by numerous clinicians and pharmacologists in England and America. About this time the author and H. C. Wood published a paper in which they expressed their belief in the powerful depressing effects produced by chloroform upon the heart; and MacWilliams, of Glasgow, proved by experiment that chloroform without doubt causes cardiac dilatation and enfeeblement. Shortly after this the author of this article was asked by the government of His Highness the Nizam, through Colonel Edward Lawrie, the Residency Surgeon, to carry out a series of studies designed if possible to reconcile the contradictory results reached by the Hyderabad Commissions and other investigators, and simultaneously Gaskell and Shore, in Cambridge University, England, were asked to do likewise. The result has been to confirm in every way the results of all previous studies in one respect, namely, that the primary action of chloroform on the vital functions of circulation and respiration is greatly to depress the vasomotor system, thereby causing an extraordinary fall of blood-pressure. Gaskell and Shore, to be sure, assert that anæsthesia can be produced by chloroform without causing this fall, but the author has never been able to do so. They also believe that the fall is chiefly a result of cardiac failure. With this view the author dissents, because their experiments upon which these assertions are based were too complex to give positive results; and, second, because his own studies and those of others show the vasomotor system to be depressed. There is, of course, some cardiac enfeeblement and dilatation, which adds to the fall of pressure.

As with other discussions in medicine, the truth of the question as to whether chloroform causes death by respiratory failure or cardiac failure lies, as it were, half-way between the two antagonistic forces; and, further than this, the somewhat startling statement may be made that it is not directly due, in the majority of cases, to either of these causes. On the contrary, *the cause of death from chloroform is usually vasomotor depression*, whereby the arterioles allow the blood to pass too freely into the great bloodvessel areas which are found in the capillaries and veins, and as a result

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the man is suddenly bled into his own vessels as effectually as if into a bowl. When it is remembered that the capillary network of the body will, with the relaxed veins, hold many times the normal quantity of blood, and when it is remembered that we can inject salt solutions into the vessels to the extent of several times the normal quantity of blood without raising the blood-pressure, it at once becomes evident that the complete vascular relaxation caused by chloroform results in failure of all the vital functions, not because the drug has paralyzed the heart or respiratory centre, but because these parts are deprived of blood by its stagnation in the widely dilated capillaries and abdominal veins. Recent studies by Leonard Hill on "The Physiology and Pathology of the Cerebral Circulation" showed that this was the case, for he asserts that when the blood was no longer flowing to the respiratory centres the heart was still beating, because its coronary arteries, being lower down, were more easily supplied by the small blood-streams received by the heart from the veins.

These studies are proved by the experiments of myself and my assistant, Dr. Thornton (*Therapeutic Gazette*, October, 1893), by every tracing of the Hyderabad Commissions, and all other tracings we have ever seen. We may conclude, therefore, that while chloroform without doubt acts as a powerful depressant poison to the respiratory centre and the heart, in the same manner as it paralyzes all living protoplasm when applied in excess, that when properly given by inhalation it produces a death equivalent to that resulting from hemorrhage, which is a failure of the respiration, not so much from a direct depression of the respiratory centre as from its starvation of blood; and while the tendency of the drug is to depress and dilate the heart, just as it dilates the vessels of which the heart is merely a highly specialized part, the failure in the pulse rests upon vasomotor palsy, the patient becoming pulseless because the heart has not any blood to pump.

Let us see what evidence supports this view: First, we have the laboratory tracings of many independent investigators extending over many years, and made in all parts of the world, all of which show a fall of blood-pressure. Among these may be named Bowditch and Minot, of Boston; Coats, H. C. Wood, Gaskell and

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Shore, the Hyderabad Chloroform Commissions, the studies of Wood and myself in 1889 and 1890, and of myself and Thornton in 1892 and 1893. They are confirmed by Hill, who has seen the abdominal vessels engorged with blood under chloroform, the medulla almost bloodless, and the heart still pumping, though respiration had ceased. They are confirmed by my own experiments in which I proved that even after the respiration had stopped, the carotid empty, and the dog apparently dead, he could be resuscitated by visceral compression and artificial respiration, and by inversion whereby the blood left the dilated abdominal veins for the heart and brain. Again, if a needle was inserted through the chest-wall the heart was found to be beating, for it moved it to and fro; and, finally, if the chest was opened the heart could still be found beating feebly—dilated, it is true, but beating.

So much for the laboratory evidence. What have we in clinical evidence? Equally positive proofs of vasomotor palsy and none of death being purely cardiac or respiratory. For years Chisholm, of Baltimore, and later Howard Kelly and a large number of others have used inversion with compression of the floating ribs in artificial respiration, which has forced the blood into the chest and saved life again and again. For years the literature of medicine has teemed with reports of death from chloroform while the patient was sitting up or half recumbent, because the blood-paths being dilated this posture favored anæmia of the vital centres. Again, it has been proved both experimentally and clinically that the best vasomotor stimulant—belladonna or atropine—given before the chloroform increases its safety, and that compression of the limbs by bandages does likewise. Finally, Hill has shown that abdominal compression also produces resuscitation by sending the blood into the heart. On the contrary, saline transfusion, which at first glance would seem to be indicated, is useless, because the dilated blood-paths will receive all the saline for a long time before they will overflow toward the heart—as fast as the fluid flows in they dilate.

My conclusions, therefore, are that while chloroform in its general depressing power depresses all vital functions, it is the question of blood-pressure which is most important, and therefore in the use of chloroform we should always keep the head low, precede the use

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of chloroform by atropine hypodermatically, bandage the limbs if the case is feeble or already bloodless, and if necessary place compresses on the belly and apply them deeply by pressure if a failing circulation is developed.

The primary action of the chloroform is to depress the blood-pressure chiefly by its vasomotor effect; secondly, by its cardiac effect; and, finally, that while the drug does exercise a depressant effect on the respiratory centre the failure of this centre is chiefly due to anæmia. As, however, an intact respiratory centre means regular breathing, we watch this function to determine the dose of chloroform actually inhaled, and because any variation in its function, as shown in irregular breathing, means that the chloroform is disordering arterial tension. Death from chloroform, then, is usually a vasomotor death, for an intact arterial system is as important to vital function as an intact cardiac apparatus.

DISCUSSION.

DR. J. EWING MEARS: In view of the opinion expressed by Dr. Hare as to the action of chloroform, I would like to ask him what effect could be accomplished by the use of a mixture of chloroform and ether. Would the stimulating effect of the ether overcome the depression of chloroform when the combination is used as an anæsthetic in surgical operations?

DR. H. A. HARE: The volatility of the two agents is very different, so that in the A.-C.-E. mixture the patient takes the chloroform at one time and the ether at another, and it is not possible to say whether the action of the chloroform will be overcome or not by the mixture in any given case. When a patient takes ether into his chest it does, to a certain amount, counteract the depressing effect of chloroform, so that there are physiological reasons for the combination of ether with chloroform; but, as stated before, the effects are not uniform.

DR. G. G. DAVIS: I have been much interested in the conclusions presented on the action of chloroform, because they are the last conclusions on the subject. There have been a number of papers presented on the subject, each of which arrived at different conclusions and each of which seems to be the best. It is certainly interesting to know that death from chloroform resembles that from hemorrhage, for it is only necessary to watch the patient's circulation to know that he is in danger, and all will

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admit that it is not necessary to watch the respiration in a person dying with hemorrhage. If I understand Dr. Hare's position clearly, it is that whereas he previously held that the respiration should be carefully watched, he now holds that the pulse is the most important. It seems that we have arrived at a stage where we have conclusions upon conclusions, and it is therefore important that these ultimate conclusions should be very carefully stated if they are to be of any use to practical surgeons.

DR. WILLIAM J. TAYLOR: I would like to ask how Dr. Hare explains the action of chloroform with oxygen, which is now given in some hospitals. Does the oxygen materially modify the effects of the chloroform or render it less dangerous?

DR. STEWART: If Dr. Hare's conclusions concerning the mode of chloroform death may be accepted as final, as I have no doubt they can be, we are clearly taught that great care should be exercised in ascertaining the condition of blood-pressure of the patient prior to the administration of the anæsthetic, and a markedly dicrotous pulse should be a decided contra-indication to the employment of chloroform. As is well known, there is a large class of individuals in whom, from a natural enfeeblement of the vasomotor nerves, low arterial tension is habitual. In these persons slight causes—such as a very mild febrile rise, depressing emotions, and the like—markedly accentuate this condition, producing easily a condition of pronounced dicrotism and hyperdicrotism in the pulse. The use of chloroform in this class would be highly dangerous.

DR. HARE: In reply to Dr. Davis's criticism and remarks I would like to say that the man who takes chloroform as an anæsthetic is influenced not by the quantity on the inhaler, but only by what he takes into his lungs. Therefore, if he breathes thirty times a minute, he gets a dose twice as large as if he breathed in the ordinary rate with easier respiration. Therefore we must watch the respirations, because we can keep account, in this way, of the amount of chloroform which goes into his lungs, and, for another reason, that we get the evidence of the amount of chloroform going into the blood. This corresponds with the results of experience and explains the success of Surgeon Lawrie, who gave chloroform in over twenty-five thousand cases without a death. The secret is, as soon as the respiration gets irregular to stop the inhalation. I would notice another fact, and that is that an intact vasomotor mechanism is as necessary to life as an intact cardiac mechanism; and as soon as you have lowered the vasomotor tone you have the heart moving too fast, just as the engine wheels will move too fast on a slippery track. The point I wish to emphasize is that the patient is bled into his own bloodvessels, and that we should always consider the vasomotor mechanism as equally important as the cardiac mechanism in studying these questions.

DR. WILSON: As Dr. Hare read his paper it put me in mind of a case of sudden death where the patient died after a few inhalations of chloro-

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form. I would like to know if the existence of vasomotor depression explains this case or not.

DR. HARE: I think that I can illustrate this question of vasomotor depression best by means of a diagram. [Blackboard demonstration.] By the employment of a mercurial manometer and kymograph the amount of blood-pressure was accurately recorded during the experiment upon dogs in studying the effects of chloroform upon the circulation. We observed the effects of lowered blood-pressure manifested within a few seconds after beginning the inhalation. I have seen a fall in blood-pressure from one hundred and twenty millimetres (the normal pressure) to zero in a very short time, and I concluded at first that it was from the effects of the chloroform upon the heart that this had occurred; but I found that if the bloodvessels were compressed that a few pulsations occurred and that presently the blood rose to as high a pressure as before. This answers Dr. Wilson's point. The case of sudden death evidently must have been the result of the sudden fall of blood-pressure, and if the abdominal muscles had been pressed in that case it might not have been a chloroform-death.

DR. S. WEIR MITCHELL: I would ask the surgeons present whether there are any statistics of sudden death upon the operating-table previous to the use of anæsthetics. There must have been a number; but if such cases occur at the present day, they are blamed upon the anæsthetic.

DR. JOHN ASHHURST, JR.: I am not aware of any comprehensive statistics on this subject, but there are records of a number of cases in which the patients died either before or during the operation, or soon afterward, from fear, shock, or pain, and in which death would probably not have occurred had an anæsthetic been used.

DR. HARE: I forgot to answer Dr. Taylor's questions. As regards the use of oxygen, I believe that it acts as a stimulant, and I have used it for this purpose myself; but I think that the mistake is ordinarily made, both in using ether and chloroform with oxygen, of allowing the oxygen to bubble through the chloroform, so that in order to give more oxygen you are forced to give more chloroform. Moreover, from an excess of oxygen the patient may get into a state of physiological apnœa and refuse to breathe. I am told that the use of ether and oxygen was discontinued at the Pennsylvania Hospital on this account; they could not get the patient to inhale enough ether to get him under. I would suggest that the oxygen be admitted by a tube at the side of the inhaler without passing through the anæsthetic; in this way the dosage of each may be controlled, and you can turn on the amount desired of each.

DR. MEARS: For the past five years I have used a mixture of chloroform with ether and have given the anæsthetic in the semi-erect posture. I have had the patients carefully watched, and in not one case has any failure of the pulse or other unfavorable symptom arisen. I should be glad to have

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Dr. Hare explain the difference in the action of chloroform, when given as an anæsthetic to children and to adults. I cannot recall a single death in a child from chloroform.

DR. HARE: I would answer the question with regard to the greater safety of chloroform in children as compared with adults by saying that it is a fact that young hearts resist the action of both chloroform and chloral better than old hearts. One advantage of chloroform over ether is that there is less danger of bronchitis afterward, and it is also less irritating to the kidneys. Another interesting point is that death from chloroform during parturition is extremely rare. One explanation of this fact is that pain is a stimulant to the vasomotor centres, and in experiments upon animals it has been shown that irritation of the sciatic nerve stimulates these centres. Now a parturient woman suffers greatly from pain, which, by stimulating the vasomotor centres, raises blood-pressure and counteracts the effect of chloroform and renders its use more safe. Hill has found that in cases attended by high arterial tension the administration of chloroform was more safe than in cases of only normal tension.

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THE VALUE OF AUSCULTATORY PERCUSSION IN DIAGNOSIS.

By ALFRED STENGEL, M.D.,
INSTRUCTOR IN CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA.

[Read January 6, 1897.]

AUSCULTATORY percussion, or stethoscopic percussion, is by no means a recent addition to the methods of physical examination. It has been used by certain clinicians for many years, and I have myself employed it very largely during the last five years. For some time I have felt that its reliability and usefulness would warrant a more general application of the method, and have been led to summarize the conditions in which I have found it valuable.

I have been unable to learn by whom auscultatory percussion was first suggested and practised, and have little desire to make a search of the literature to determine this point. Da Costa, in his book on *Diagnosis*, calls attention to the fact that it was employed by Cammann and Alonzo Clarke, and the latter was accustomed to demonstrate it before his class. De Mussy described a method of "auscultation plessimétrique" in 1876.

The methods themselves have varied somewhat as practised by different clinicians. De Mussy's method is as follows: The physician stands at the side of the patient and percusses over the upper dorsal vertebræ, the sternum, or clavicles, while the stethoscope is moved from place to place on the opposite side of the chest. Dr. Andrew H. Smith suggested the following method: The chest-piece of a binaural stethoscope is placed in the patient's mouth, and the lips compressed about it while the nostrils are compressed at the same time. The physician or an assistant then

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percusses the chest in various positions. Either of these methods may be employed to distinguish areas of pulmonary consolidation and the like ; but their sphere of applicability is restricted even in thoracic diagnosis, and neither method is available for abdominal exploration.

My own experience has been with the simpler and more generally useful method of direct stethoscopic percussion of a certain organ. In the practical application of this method the chest-piece of a binaural stethoscope is applied to the surface of the body covering the organ under examination, and is held in place by the patient or an assistant. The examiner at the same time percusses lightly, using a plexímeter or the fingers alone, and approaching the supposed outlines of the organ from points at some distance. As soon as the outer limits of the organ over which the stethoscope is applied are reached the ear detects a decided change of note. This change consists in an elevation of pitch and greater intensity of sound, and is recognized without any difficulty after very little practice.

In suggesting his method of plessimetric auscultation De Mussy foresaw that objections would arise on the part of those who had not practised some such method, and who might be disinclined to investigate and acquire new modes of examination. This fear was well grounded, and objections have been urged, as I shall show below. It is well, therefore, to recognize in the beginning that auscultatory percussion embodies no really novel principle. We recognize by its aid exactly the same phenomena that occur in ordinary percussion, with the difference that the sound vibrations are conveyed directly instead of indirectly. In percussion of any organ or part of the body vibrations are set up that occasion certain sounds—resonant or dull, according to the state of the organ or the part examined. These vibrations are produced in the parts beneath the point of percussion, and are diffused more or less extensively, according to the nature of the parts and the strength of the blow. To a certain extent vibrations may be transmitted beyond the confines of the organs percussed, this transmission depending upon the distance from the limits of the organ at which percussion is practised, the strength

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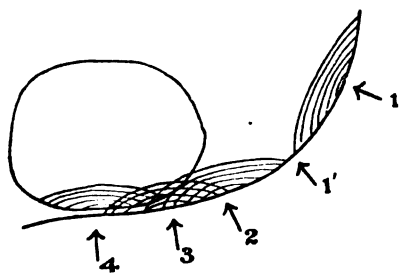
of the strokes, and the nature of the adjacent organs. It is therefore difficult to determine the exact limits when the vibrations passing through the air are depended upon. Auscultatory percussion is useful in eliminating disturbing sounds and in allowing the recognition of vibrations emanating from a single part. In the accompanying figure (Fig. 1) these points are graphically

FIG. 1.



Showing diagrammatically the distribution of vibrations caused by percussion over the heart and lung.

represented. The relative positions of the heart, lungs, and chest-wall are represented, and the vibrations occasioned by percussion at various points are illustrated diagrammatically. When the plexímeter is placed at 1 the vibrations are confined to the chest-wall and the lung-tissue, and the clear note of pulmonary resonance is obtained. When the percussion is practised at 4 the dull sound of the heart is noted. At 2 vibrations arise that involve the lung-tissue to a greater and the cardiac to a less degree; while at 3 the reverse obtains. In either case it is difficult to determine precisely whether the note is that of cardiac dulness or pulmonary resonance. The difficulty is to a large extent removed by the simultaneous use of the stethoscope. If the chest-piece is placed at 4, for example, and percussion is practised at 1, no vibrations, or, at most, distant ones transmitted through the lungs or chest-wall, are recognized. When percussion is carried to 1′ the sound becomes louder, but still indistinct. Only when the point 2 is reached, and the percussion-stroke is directly over a part of the heart (even though a thin edge of lung separate the heart from the chest), is the sound obtained, immediate and

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clear. Even with this method there must be a certain amount of error in determining the limits of certain organs, like the heart, which slope away from the chest-wall; but the error is much less than with ordinary percussion.

Care must always be taken to place the patient in such position as to relax the superficial parts, and thus eliminate the vibrations transmitted through the fasciæ and muscles.

In the practical application of the method I have repeatedly satisfied myself of its superiority over ordinary percussion in cases in which an experienced diagnostician could readily use either method. In my demonstrations to students, for example, I have frequently marked the limits of the heart by ordinary percussion, and then allowed the students to determine the limits by auscultatory percussion, keeping their eyes closed while I percussed lightly. The accuracy of the results has been very striking, and contrasts strongly with the variability in the outlines novices obtain from ordinary percussion of this organ.

Objection has been made to this method by a number of writers, some of whom have evidently practised it but little. I wish only to allude to the criticism of Dr. Herschell. This observer found that the change of note occurred when the pleximeter was brought within a certain distance from the chest-piece of the stethoscope, the distance being equal on all sides, and therefore in no way dependent upon the underlying organs. Mr. Bezly Thorne has adequately answered this criticism, which manifestly rests upon insufficient observation; but I have repeatedly demonstrated the unsoundness of Dr. Herschell's view in a practical way to the satisfaction of students and others inexperienced in this method. I have, for example, placed the chest-piece of the stethoscope over some part of an organ near its periphery (as over the heart, at A, Fig. 2), and outlined the organ, finding the same change of note when the percussion reached the limits of the organ near the stethoscope as that occurring when the pleximeter reached the periphery of the organ most distant from the stethoscope. I have then placed the stethoscope at a distant part of the organ (as at B, Fig. 2), and found that the limits determined by the percussion were exactly the same as before. This practical

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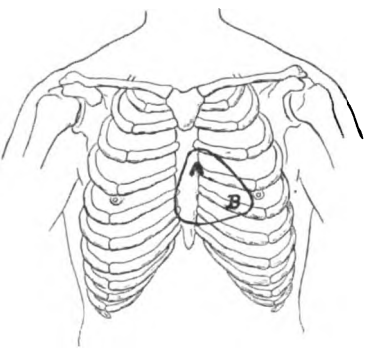
demonstration that the change of note is dependent upon the underlying organ, and not upon the mere distance of the plexímeter from the stethoscope, is convincing, and I do not therefore find it necessary to invoke theoretic considerations in explanation or defence of the method. It may, however, be well to explain, as Thorne has done, that there is a certain amount of vibration of the chest-walls themselves which will reach the stethoscope from variable distances surrounding the stethoscope, and that these become audible when percussion is practised within this area. A very little experience, however, will teach us to distinguish between such a change of note and that arising from vibrations in the deeper structures.

FIG. 2.



Very recently a method has been proposed by Bianchi and Compte, in which the phonendoscope of the former observer is employed. This instrument is a modified form of microphone, in which the vibrations over the chest are transmitted directly or through a metal stem to a system of ebonite plates, and from these through rubber tubing, as in the ordinary stethoscope, to the ears.

The instrument in itself has certain advantages in conveying faint sounds very clearly to the ear, and it may be employed as the ordinary stethoscope. I have, however, found little advantage over the binaural stethoscope and several disadvantages. The pressure necessary when the metal stem is used is such that at times, with the small size of the button upon the metallic stem, considerable pain or discomfort is occasioned; and when the

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stem is not used the instrument covers too large an area. In young children I have found it practically impossible to use the phonendoscope with satisfaction on this account. It was hoped from the magnification of the sounds obtainable with this instrument that it would prove especially useful in auscultatory percussion, and Compte in particular described a method of procedure for which he claimed brilliant results. The button of the phonendoscope, according to this method, is placed over the organ to be examined, and the ear-pieces are adjusted, whilst the finger is drawn over the skin, beginning at the point where the button is applied, and running outward in radiating lines from this as the centre. As soon as the finger passes beyond the limits over which the button is placed it is claimed that the rasping bruit heard before suddenly ceases. This change of note is described as being very abrupt and distinct. In my experiments with this method I have uniformly found that such was not the case. The note does suddenly change when the finger has passed to a certain distance from the button of the instrument; but this distance is equal, more or less, in all directions, and it seems to me easy to explain this fact. The vibrations occasioned by the finger drawn over the skin cannot manifestly occur in the deeper tissues or organs, but only in the skin and the immediately subdermal tissues. It is quite improbable, therefore, that the position of the deeper organs would have any influence upon the sounds obtained through the instrument, and it is altogether probable that these sounds would be greatly influenced by the distance to which the finger is carried from the instrument. This distance, of course, represents that to which vibrations in the skin are readily transmitted. The method of Compte is therefore, I believe, wholly useless. The phonendoscope itself may be employed for auscultatory percussion after the ordinary method; but I find no advantage here over the ordinary stethoscope, and perhaps the loudness of the sounds may in some cases prove an actual disadvantage.

I wish now to consider somewhat in detail the value of this method in the examination of the different organs.

THE HEART. In applying auscultatory percussion to this organ I am accustomed to place the stethoscope near the apex, and then

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to mark the limits on all sides by percussing lightly and then heavily, but always with strokes of equal force in each separate determination. The lower border, where the left lobe of the liver and stomach lie adjacent, is usually determined with great precision, and the same to a slightly less extent may be asserted of the oblique border and the apex, where the change of note in passing from the lung to the heart is usually quite distinct. The upper limit, particularly that immediately beneath the sternum, is more difficult to determine accurately on account of the more ready transmission of vibrations through the sternum and ribs. In persons with emaciated thoraces, and particularly in those in whom the sternum bulges forward, the difficulty may be very great; but I have never as yet failed to determine with measurable satisfaction what seemed to me to be the limits of the organ in this direction. It will in difficult cases be necessary to percuss a number of times and with varying force before a conclusion is reached; but when the practical impossibility of determining by ordinary percussion the position of the upper border in the cases here alluded to is considered, the advantages of the stethoscopic method must be admitted to be very great. Thorne contends that the note over the great vessels at the base of the heart (the aorta and pulmonary artery) may be distinguished from that of the heart, and that a bipartite outline of the organ, due to the auriculo-ventricular groove, may be determined. These claims seem to me somewhat too extravagant; and though I am prepared to admit that some distinction may at times be noted in normal cases between the sound heard when percussion is practised over the vessels and that audible when the heart itself is percussed, I have never been able to draw sharp lines, and cannot pretend to distinguish the position of the auriculo-ventricular furrow. In some few cases of enlargement of the aorta in aortic valvular disease, and still more in cases of aortic aneurism, I have found separate areas, such as those represented in Figs. 3 and 4.

The right border of the organ above the hepatic dulness is usually easy to determine, though there is some difficulty in emaciated persons. Projection of the right auricle beyond the right border

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of the sternum is discovered in many normal individuals, though by no means in all. The inferior border on the right side, where the heart and liver are adjacent, is somewhat difficult when the ensiform cartilage and the ribs are closely approximated and projecting, but as a rule little difficulty is encountered. Ordinary percussion may in some cases suffice to determine where cardiac dulness ceases and the hepatic begins by the change of note detected; but there can be no comparison in accuracy between the older method and stethoscopic percussion.

FIG. 3.

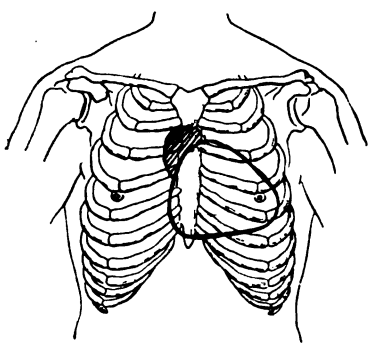

FIG. 4.

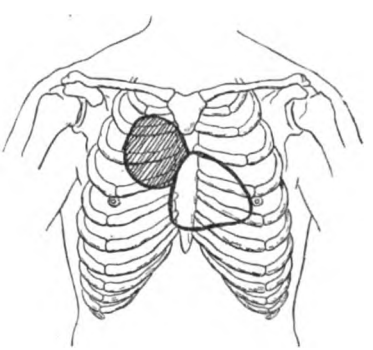

FIG. 3.—Mitral and aortic disease, showing distinct area of aortic enlargement. The line of demarcation between aortic and cardiac dulness was not as distinct as the diagram would suggest, but was undoubted.

FIG. 4.—Aneurism of the arch of the aorta, showing distinct area of dulness. The line of separation was sharply marked.

I have not preserved sufficient records of the exact outlines of the heart obtained in normal cases to state the limits in health, but have repeatedly noted that the area is greater than that obtained by ordinary percussion. The right border frequently extends beyond the right side of the sternum, as I have said before, and the left border as far to the left as the nipple-line; the base is found as high as the second interspace in many instances.

Besides the greater accuracy obtained by this method of exploration in ordinary cases it may be mentioned that in emphysema of the lungs stethoscopic percussion often proves satisfactory when the older means of examination are useless. In cases of moderate marginal emphysema, of malformation of the lungs, or of abnor-

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mal lobulation or retraction of the anterior portions of the lungs, in which the heart is either excessively or insufficiently covered by the lungs, a comparison of the extreme limits obtained by auscultatory percussion with those determined by the ordinary method may clear up conditions not otherwise discoverable. Finally, an advantage of this method is found in children or sensitive adults in whom it is undesirable to use force in striking the chest, and in whom, therefore, ordinary percussion is unsatisfactory.

My experience with auscultatory percussion in pericardial disease is limited to a few cases, and I can merely state that it commends itself on account of the early discovery, possible by this means, of dulness on the right side of the sternum. The liquid collects in the pericardial sac surrounding the right auricle quite early in the disease, but may for some time occupy only the posterior part of the pouch. Auscultatory percussion will determine such effusion much sooner than the ordinary method.

Lungs and Pleura. The spongy structure of the lung renders this organ less satisfactory for the application of the method under discussion. It is possible to limit areas of consolidation with accuracy when they are considerable in size, but in this respect the method has little advantage over simple percussion. When the areas are small and the consolidation merges gradually into the normal pulmonary tissue auscultatory percussion is unsatisfactory. I have not found the method of material assistance in cases of beginning consolidation of the apices. In these cases so much disturbance may be occasioned by varying conditions of the bony framework, by the force of the percussion-strokes, and other factors that I should hesitate to accord it special advantages in diagnosis. In cases of large cavities I have found stethoscopic percussion useful, though but little more satisfactory than ordinary percussion. When there are small cavities these may at times be localized by placing the stethoscope over a somewhat removed portion of the lung and percussing near the supposed situation of a cavity. There will be found quite a marked reduction of sound when the percussion passes from the healthy or consolidated lung to the area of excavation. Unfortunately, the consolidation surrounding small cavities is usually so dense or extensive that vibra-

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tions emanating from this source interfere with the nicety of the method.

A great advantage is found in cases of consolidation of the bases when it is difficult to determine by ordinary methods to what extent dulness is due to hepatic or splenic enlargement or to pulmonary consolidation. It is true, of course, that the spleen and liver, as a rule, become displaced or enlarged in a downward rather than an upward direction; but still there are cases in which the question of the upper limit may be difficult to determine. In such instances the stethoscope may be placed over the liver and the upper border of this organ determined; then over the lung and its lower limit defined. I have found this mode of examination useful in several cases, particularly in one of great hepatic enlargement in a rhachitic child recently under my care.

In case of thickening of the pleura the extent of the area of involvement may be determined by this method, though there is no material advantage over ordinary percussion. In cases of pleural effusion, however, the upper limit of the liquid is easily determined, and, as has already been indicated in speaking of the delimitation of the liver and of pulmonary consolidation, auscultatory percussion has special value in permitting a ready distinction between the dulness of the pleural effusion and that of the subjacent liver. I conceive that in cases of interlobular pleural exudate the outlines of the area of dulness might be more easily determined by this method than by ordinary percussion, but have had no experience in this matter. It is possible, also, that auscultatory percussion may prove of some value in distinguishing between obscure cases of subdiaphragmatic collections of pus and pleural effusions by revealing, on the one hand, a gradual increase in the intensity of the note heard with the chest-piece of the stethoscope over the liver while percussion is carried downward toward the liver, this gradual increase in sound being explained by the transmission of vibrations to the liver from the liquid immediately above it, while in pleural effusion a sharply defined line would be obtained as soon as percussion was carried below the diaphragm and to the upper border of the liver. This, also, is purely speculative, as I have had no occasion to test the matter in practice.

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THE ABDOMINAL ORGANS. While the advantages of the method under discussion are sufficiently great in the diagnosis of thoracic diseases to warrant its more general adoption, I have found it particularly serviceable in obscure abdominal affections and as a routine method in the examination of the stomach.

THE STOMACH. The unreliability of direct percussion of the stomach need not be considered at length. It may be said, however, that among the conditions which render it inadequate are the extent to which the left lobe of the liver covers over the lesser curvature and upper part of the organ, the fact that a large part of the body is concealed by the ribs on the left side and covered over by the arch of the diaphragm, and by the fact that not rarely a distended colon or one containing fecal matter may remove the lower part of the organ from the abdominal walls and render percussion uncertain. Auscultatory percussion has the advantage that it is rarely difficult by firm percussion and by repeated trial to distinguish the limits of the organ even beneath the thin portion of the liver that usually covers it over. The same may be said of the portion of the stomach covered by the lung, diaphragm, and ribs, and, to a less extent also, of the inferior border where chronic distention ordinarily interferes (Fig. 5).

The routine employment of this method in the examination of the stomach of many patients has convinced me that its advantages in the recognition of the size of this organ are second only to those of direct inflation with atmospheric air or gas. It is practically always possible to determine the lower border of the organ, the position of the fundus, and of the lesser curvature. From these data the probable size and position may be determined with considerable certainty.

In the accompanying diagram (Fig. 6), representing the outlines of the organ as determined by stethoscopic percussion in a case of carcinomatous stenosis of the pylorus, the positive demonstration that these outlines were correct was furnished by subsequent inflation of the organ with the aid of a stomach-tube and the bulb of a Davidson syringe. It will be readily seen from the diagram that the lesser curvature was considerably depressed below its normal position, so that an explanation was readily obtained for the depression

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visible in the epigastric region. At the first examination of this particular case the great enlargement of the organ was not discovered, and I was inclined to attribute the failure to the method, whereas it was subsequently discovered that this failure was attributable rather to hasty examination. In an examination of the

FIG. 5. FIG. 6.

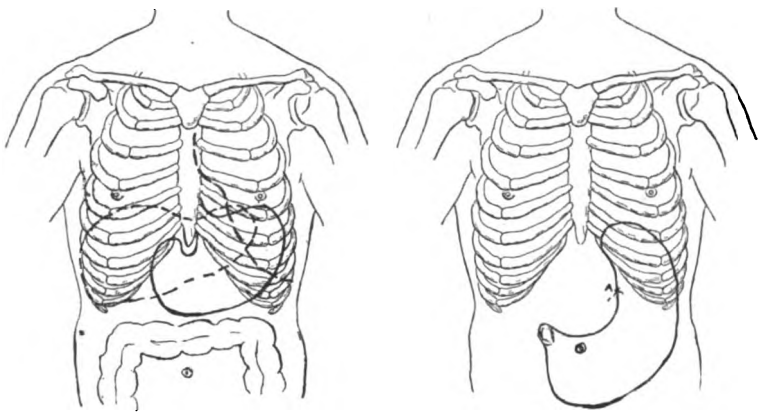

FIG. 5.—Showing the extent to which the liver and lung cover the stomach normally, and the relation of the colon to the greater curvature. (Modified from Luschka.)

FIG. 6.—Carcinoma of the pylorus, showing the outline of the stomach obtained by auscultatory percussion; confirmed by inflation.

patient the chest-piece of the stethoscope was placed over the position of the normal fundus, and percussion was made from a point just above the umbilicus toward the inferior margin of the left ribs. Gastric tympany was not obtained until the point A was reached, and it was erroneously inferred that the organ was rather small than large. Subsequent examination showed the outlines in the diagram. The determination of the upper curvature by this method is of particular advantage in distinguishing cases of gastroptosis and gastric dilatation. In the case of tumors of the pyloric region it is generally possible to determine that the neoplasm is connected with the stomach, and thus an aid is afforded to the differential diagnosis between gastric tumors and tumors of the gall-bladder. The determination of this point is accomplished by placing the stethoscope over the body of the stomach and carefully percussing toward the tumor from all directions. The note

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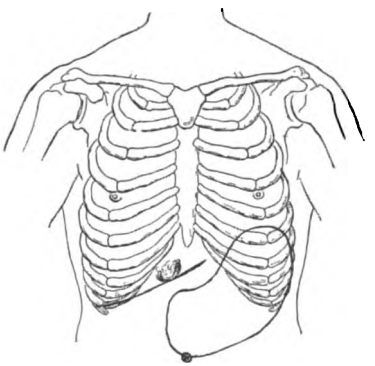
obtained from the tumor may be quite different from that found over the uninvolved portions of the organ, but it will be noted that the tone over the tumor is much more nearly like that of the stomach proper than that found in the surrounding parts. The diagram (Fig. 7) represents a case of neoplasm of the liver in which the test just alluded to was made, and served to indicate that the tumor was situated away from the stomach, this being confirmed by inflation of the stomach and subsequently by exploratory incision.

FIG. 7.



Tumor of the liver. Outline of stomach determined by auscultatory percussion.

Great advantage may be obtained by combining inflation with auscultatory percussion, in which case the exact limits of the organ are usually obtained with very great ease. As a rule, however, inflation is unnecessary, and in routine practice is undesirable.

INTESTINAL DISEASES. It is possible at times to determine the exact course and size of the colon by this method, providing, of course, that the bowel is empty and well inflated. Lavage and partial inflation may be practised previous to the examination in cases of particular interest. I have found, by placing the chest-piece of the stethoscope over the caput coli and percussing over the centre of the abdomen toward either side and toward the epigastrium, that the inner limit of the large bowel could often be determined; and subsequently, by percussing from the extreme flanks and from above toward the middle of the abdomen, the outer limit

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of the ascending, descending, and transverse colon could be determined. If the small intestines are greatly inflated, however, it is scarcely possible to distinguish sharply between the note of the small and large bowel. In one case I was able to determine that a tumor occupying the left flank was connected with the descending colon, and in another instance located a carcinomatous mass at the hepatic flexure by this method. In these instances the limits of the colon were first determined, and the tumors referred to were found to correspond to the course of the gut; then careful percussion was made over the tumor and toward it from all sides, with the stethoscope over the adjacent but uninvolved part of the bowel. Finally the stethoscope was placed over the tumor itself and percussion directed toward the intestine near by. The result of all of these procedures showed plainly that the tumors involved the bowel walls.

THE LIVER. The exact limits of this organ are easily determined, as a rule, by this method, and neoplasms directly connected with it are readily distinguished from tumors of adjacent viscera which occupy a position near to the liver, but unattached to it. The example already alluded to of a neoplasm of the lower edge of the liver serves to indicate the advantage of the method in distinguishing the exact seat of such growths. When adhesions have taken place between the liver and tumors of the neighboring organs, particularly of the stomach, and especially when the tumor has infiltrated the liver-substance and a confused mass of neoplasm is thus established between the originally involved organ and the liver, greater difficulty is experienced, and, as a rule, it is impossible to determine whether the seat was primarily in the substance of the liver or in an adjacent organ. As an instance of this I may cite a case of carcinoma of the pylorus and lesser curvature of the stomach which had become connected with the left lobe of the liver and in which auscultatory percussion determined a gradually diminishing note toward the stomach and toward the liver. It was impossible to determine which organ the disease had invaded most extensively. In cases of neoplasm of the body of the gall-bladder and in case of empyema or dropsical swelling of this sac the distinction from new growths of the stomach or

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from movable kidney may sometimes be possible. I have found it so in several instances of moderate enlargement of the gall-bladder; but must admit that in cases of greater enlargement of the gall-bladder difficulty would probably be experienced, since the vibrations would not be transmitted to the liver when the neck of the gall-bladder or the pedicle of the tumor, so to speak, is much attenuated. Unfortunately, I have had no opportunity to examine such a case by this method.

THE SPLEEN. Greater exactness may be obtained in determining the limits of this organ by auscultatory percussion than by the ordinary method; but I am not as yet convinced that it possesses sufficient advantages to determine in all cases by this method alone whether the organ is enlarged or not. So much depends upon the exact position of the organ, whether it projects against the chest-walls with the narrow edge or the broader side, and upon other conditions, that I am unwilling to assert that it is possible to determine, from the percussion-limits, whether the organ is normal or somewhat enlarged. Of course, in cases with great enlargement auscultatory percussion will be found satisfactory; but it may be said that ordinary percussion is available in the same cases. After all, a combination of palpation with percussion should be relied upon rather than either method alone.

THE KIDNEYS. In several cases of pyonephrosis I have found that the enlarged organ could be readily outlined by stethoscopic percussion; but in these cases palpation and even inspection of the back with ordinary percussion were almost as satisfactory. The only advantage obtained was that of a greater feeling of security in ascertaining the enlargement of the affected organ.

I have met with no case of moderate enlargement of one kidney in which I have been able to assert from the use of this method that the organ was enlarged when the ordinary methods of examination had failed to reveal any enlargement. It is not impossible or improbable, however, that such borderline cases may be discovered now and then.

In practising the method upon the kidney the greatest possible attention to certain details is necessary. If a patient is standing in an erect position, the large lumbar muscles are so stretched and

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prominent that the vibrations obtained from these will overshadow any that might be obtained from the deeper-lying organs, and I have found that it is practically impossible to determine with any degree of satisfaction the position of the kidneys. The same may be said of the prone position in bed unless the patient be placed upon a number of pillows heaped up so that the back is somewhat arched and the muscles are entirely relieved of any tension. A more comfortable position, however, is one midway between the prone and the lateral position. The patient is placed in this posture and the physician stands at his back and is then able to examine the kidney of the opposite side from that on which the patient is lying, with a fair amount of certainty in the results. On the whole, however, I have obtained no striking results in the examination of the kidneys.

DISCUSSION.

DR. D. D. STEWART: It may be of interest to state that this method of auscultatory percussion was originated by Drs. Cammann and Prof. Alonzo Clarke as far back as 1840. It was most painstakingly studied by Dr. Clarke and elaborated in monographs and in his book on *Diseases of the Heart*, published a number of years ago. Little was really left to be added to his description. We are, however, indebted to Dr. Stengel for an interesting study of the subject, especially interesting since his observations are unbiased by the earlier work of the originator of the method, which he states is somewhat unfamiliar.

I have practised and taught this method with great satisfaction since I first saw it described in Prof. Clarke's published lectures about ten years ago. In very recent times I have resorted to it with great satisfaction as a means of delimitating the stomach, and its separation from the liver and colon. By its means the lower limit of the stomach can be made out with the greatest ease, when the results of the ordinary percussion are doubtful. The position and size of the colon can also be readily ascertained, as can the line of demarcation between the right and left lobe of the liver.

DR. FREDERICK P. HENRY: I have myself frequently seen Dr. Clarke use this method, which I regard as a modification of auscultation rather than a form of percussion.

DR. JUDSON DALAND: I have employed the phonendoscope during the past three or four months, more particularly in cardiac and pulmonary dis-

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eases. I find that in the study of heart-murmurs the ordinary stethoscope in the hands of a trained observer gives rather better results than when the second diaphragm and rubber-tip rod are attached to the phonendoscope. Its greatest value, in my judgment, is in those conditions of the lung where the breath-sounds are extremely feeble, and upon several occasions I have been enabled by its use to clearly recognize and classify abnormal variations in the respiratory murmur. Upon one occasion, where the breath-sounds were extremely weak, it was impossible to determine their exact character until this instrument was employed.

DR. S. SOLIS-COHEN: I would ask Dr. Stengel if he uses plesser and pleximeter, whether artificial or the fingers, or gently taps with the pulp of one finger directly upon the walls of the chest or abdomen, gradually approaching and receding from the spot where he places the bell of the stethoscope? This latter method, devised, I believe, by Dr. Benedict, of Buffalo, I have used for about three years, and have found it usually more successful than the method I formerly resorted to—namely, that developed by Clarke and Cammann. Sometimes it is necessary to use both methods and compare the results. One great advantage of Benedict's plan is that it dispenses with an assistant, who in the older method must, in the absence of a self-affixing stethoscope, either hold the instrument or make the percussion.

DR. STENGEL: I can merely say that I have thought that Dr. Cammann was the originator of this method, although I know that several continental writers claim that it was used in Europe for years before he brought it to notice. It does not matter much, however. I have used the fingers as plesser and pleximeter, and have also used the simple tapping as suggested by Dr. Cohen, and must confess that I have not had very good results from the latter method.

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FINAL REPORT OF A CASE OF A VERY LARGE INNOMINATE ANEURISM

COMPLETELY CURED BY THE EMPLOYMENT OF ELECTROLYSIS THROUGH TEN FEET OF SNARLED, COILED, FINE GOLD WIRE, INTRODUCED INTO THE SAC; DEATH AT THE EXPIRATION OF THREE AND A HALF YEARS FROM CEREBRAL THROMBOSIS.

By D. D. STEWART, M.D.

[Read January 6, 1897.]

It has recently been the writer's extreme good fortune to obtain a necropsy on the case of a very large innominate aneurism on which he, over forty-one months before, employed galvanism through ten feet of coiled gold wire, which he had introduced, resulting in complete solidification of the sac. The history of this case was published in detail in the *American Journal of the Medical Sciences* very recently (August, 1896), so need not be repeated here. Suffice to state that the case was one most unpropitious for any treatment. The patient was what in street parlance is styled a "bum" or "rounder," who had been an habitual spirit drinker. He was also a syphilitic, had pronounced aortic and mitral disease, with extensive cardiac enlargement, generalized endarteritis, and had also chronic nephritis. The aneurism formed a large and prominent swelling at the root of the neck. It was regarded as springing from and being limited to the innominate artery. The sac-wall was of extreme thinness, and, at least externally, was unprotected by clot. This, which was apparent to the eye and touch, was further demonstrated by puncture with needles.

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At the time of operation the sac-wall seemed on the point of bursting externally in several situations over which the skin was extremely thin and bluish.

The result of electrolysis through the introduced wire was very decided. Clot-formation leading apparently to solidification of the sac was early manifest. The patient lived for nearly three and a half years after operation, and finally died as the result of the formation of a large thrombus in the middle cerebral artery, the result of the advanced endarteritis present. Despite the most unfavorable condition of the patient, his bad cardiac and renal disease and generalized arterial sclerosis, his having had syphilis, and being a steady spirit drinker, the result obtained, which I show you to-night, speaks strikingly in favor of this procedure as a method of treating sacculated aneurism. The sac has been found to be of extreme hardness with complete consolidation and obliteration of its cavity.

Report of the Necropsy: G. D., aged forty-three years; white, male; died December, 1897. Necropsy made by Dr. A. A. Ghriskey and the writer four hours after death. Body fairly well nourished. Aneurism tumor noted in the situation described.

Thorax: The solidified tumor with clavicle and three ribs on the right were removed and the thoracic cavity exposed. The clavicle with the three ribs, the ascending and descending aorta, heart, and pericardium removed *en masse.*

Lungs: Slightly adherent at both apices. The bases showed hypostatic congestion.

Abdominal cavity: The spleen was somewhat enlarged; its section showed it to be intensely congested, with the trabeculæ visible. Stomach normal in size and situation. Small and large intestines normal. But one kidney could be found; this was considerably enlarged. It was thought to have been placed aside with the other specimens for subsequent examination, but unfortunately must have been returned to the body, as it afterward could not be found with the specimens. The liver was somewhat enlarged and deeply congested. The gall-bladder contained fluid bile; the common bile-duct was patulous.

Heart: Pericardium non-adherent. The sac contained a normal quantity of fluid. The heart was very much enlarged—26.5 cm. in circumference. Length of the interior left ventricle, 11 cm. Thickness of left ventricular wall, 2.5 cm.; thickness of right ventricular wall, 1.2 cm. The cardiac muscle was of dark-red color. No areas of opacity apparent. Aortic leaflets

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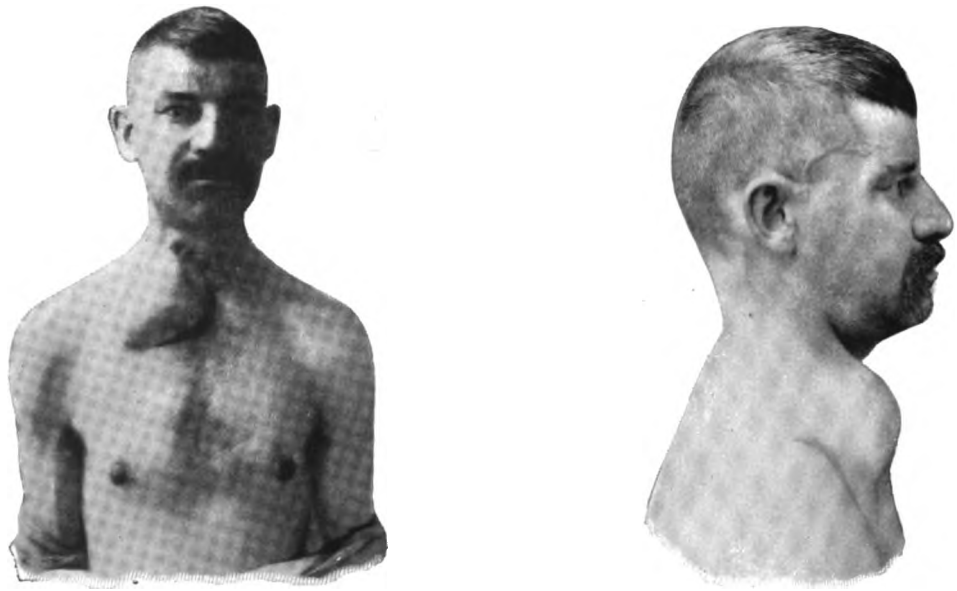

CASE OF J. D. Consolidated innominate aneurism. (*Therapeutic Gazette*, September, 1896.)

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Obliterated innominate aneurism after section, wedged open. The coils of wire are shown engaging the sac wall and the organized coagula. The coagula had been as one solid mass when the tumor was first sectioned and until frequent handling of the specimen, during its exhibition, had led to their partial disintegration and detachment from the sac wall. Prolonged soaking in the preservative used (weak formalin solution) also favored this. The photograph was unfortunately not taken for some time after the specimen had been on exhibition.

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thickened. Above their inferior attachment for a distance of 1 cm. the leaflets were densely sclerosed. The aortic valve was found to be very insufficient. Superior border of two of the leaflets was densely sclerosed. A few atheromatous patches were present on the intraventricular surface of the aortic valves. The mitral valve was very patulous, thickened, and slightly opaque and markedly insufficient. Left auricle was dilated, with thickened walls. Right auricle was normal in size; tricuspid and pulmonary valves were normal. The coronary arteries were patulous. The aorta from its origin is the seat of very diffuse atheromatous degeneration with small areas of calcification. Internal circumference of the aorta above aortic valves 10 cm. The aorta was dilated from its cardiac origin, but a separate and very distinctly outlined extensive fusiform dilatation existed from 1½ cm. to the left from the origin of the left subclavian artery, at the junction of the transverse with the descending portion of the aorta, downward to a distance of 10 cm. This fusiform sac at its greatest internal circumference is 15 cm. This dilatation—a typical fusiform aneurism—is sharply defined above and below by concentric elevated rings or constrictions of the whole circumference of the aorta. The entire aorta, including the dilated portion, is uniformly thickened. The inner surface of the fusiform sac shows widespread atheromatous patches. The sacculated aneurism springs directly from the root of the innominate artery. The aneurismal sac is approximately the size of a fœtal head at term; length, 13 cm.; transverse diameter, 9 cm. The sac is completely consolidated with organized coagula in which lie the coils of wire. The consolidated sac has at its base a small cul-de-sac, the remains of the innominate artery. This, from the aorta, admits the little finger to a distance of 4 cm. through an annular ring, sharply defined, 2 cm. in diameter. The cul-de-sac was noted to contain in its interior a small coagulum, presumably of post-mortem formation. The sac itself was very firm and wholly solidified, and when cut into was found to be completely occupied by organized material, in the interstices of which lay the coils of fine gold wire.

Brain: A large thrombus is evident in the left middle cerebral artery. Softening has occurred in the region of the corpus callosum, caudate and lenticular nuclei, and in the internal capsule of the left side.

The writer has now treated two cases of sacculated aneurism by the employment of electrolysis through introduced wire, and has directed the technique in a third successful case. This has naturally led him to give a good deal of attention to the subject. The result in his second successful case, the necropsy of which is here reported, and that obtained in the case treated by Dr. Hershey, of Colorado, in which the solidification of the aneurism resulted by

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this method (see the *Therapeutic Gazette*, September, 1896), is sufficiently suggestive to engage the attention of the therapeutist.

The history of the treatment of aneurism by this method need not here be entered into, it having been thoroughly reviewed by the writer in his initial paper on the subject (*American Journal of the Medical Sciences*, October, 1892), and again resurveyed in a recent second paper, in which a successful case was reported (*American Journal of the Medical Sciences*, August, 1896). In the earlier contribution I passed in review the various recorded cases in which wire alone was employed, the method first suggested and carried out, though faultily, by Moore, of the Middlesex Hospital (*Med.-Chir. Trans.*, vol. xlvii.) in 1864. I remarked on the slightly appreciated though decided advantages possessed by this plan of treatment, and referred to the truly remarkable results obtained in certain of the cases, such as Loretta's, of Bologna, and Morse's, of San Francisco. I likewise pointed out that the exceedingly faulty technique in a number had probably been the only source of failure in others, the condition of which was at all susceptible to alleviation or cure, and especially in that of Moore, the originator of the method. This must be regarded as highly unfortunate, as it served to diminish the chances of recognition, and a deserved place in the therapeutics of aneurism, for a second and far more promising plan of treatment of which the use of wire is an essential feature. This method the writer, as a consequence of thoughtful consideration of the details and now some practical experience, views with the utmost favor as one, in experienced hands, devoid of danger and most promising of benefit if not of absolute cure; more promising, indeed, than the usual methods in vogue, save, perhaps, that by deligation. These errors, as the result of which failure occurred, and because of which the method of treatment of aneurism by the introduction of wire became the subject of unfavorable criticism, as remarked, lay in the employment of faulty technique, from which failures cannot but be expected. In Moore's case, in which a great excess of wire had been introduced, death occurred from sepsis. In many other of the cases, although the operation was a successful one, so excessive an amount of wire was employed that it could not but surely interfere with the ulti-

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mate result desired, through which permanent cure can only be expected, that of obliteration of the sac-cavity.[1]

Briefly, the newer method, which can be regarded as a most decided advance on the older plan of treatment of aneurism by the mere introduction of filiform material, as practised by myself, consists in introducing into the sac, under the strictest antiseptic precautions, a fine silver or gold coiled wire, previously so drawn that it may be readily passed through a thoroughly insulated needle of somewhat larger calibre than the wire, and, after introduction, assume snarled, spiral coils that, with a moderate amount of wire, the entire calibre of the sac will be reached, unless the cavity be already filled with coagula or the sac be of unusual size (as was the case with the first aneurism I so treated).

The wire, as remarked, must be neither in amount nor calibre too great nor too bulky or highly drawn that the results to be desired be interfered with. Nor should the wire be of a material so brittle as steel nor of hard-drawn iron, lest fracture occur in process of contraction of sac, with danger of rupture. Nor should it be of soft iron, as was recommended on theoretical grounds by Stevenson; for with the last, as I have shown by experiment, so great a quantity of detritus will result, due to the decomposition of the iron and the formation of insoluble salts under the current influence, even with low ampèrage, that danger of emboli results.[2]

Silver or gold wire is undoubtedly preferable material. Silver-coppered wire, employed by Loretta in his case, in which wire alone—without galvanism—was used, possesses no advantage over that of silver alone, and if it were used might be provocative of toxic symptoms through the amount of copper dissolved under the current influence.

The amount of wire required depends necessarily upon the calibre of the aneurismal sac, and must be decided upon with the

[1] It is within the meshes of the solidified contracting coagulum that the wire must lie. Should the wire be excessive in amount or of undue firmness, or so highly drawn that its fracture is likely, not only will contractions of the organized thrombus be interfered with, but the rupture of the sac may be induced in process of the former. These imperfections in method I pointed out in detail in my first paper on the subject.

[2] As to this point, see the last part of my first paper in which some experiments with soft iron wire are detailed.

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greatest nicety of judgment, since with too small an amount little or no result will be obtained, and with too great a quantity permanent cure through obliteration of sac by contraction of clot cannot be expected. For a globular sac of approximately three inches in diameter I regard three to five feet sufficient; for a sac of four to five inches, eight to ten feet. How readily these amounts comply with the conditions is shown by the introduction through a needle of measured amount of spirally wound snarled wire into globular corked bottles of approximately the size stated.[1]

The anode or positive pole should invariably be the active electrode. This is connected with the wire, and the negative rheophore, a large clay plate, or an absorbent-cotton pad of equal dimensions, made after the method of Massey, is placed upon the abdomen or the back. The current is slowly brought into circuit and its strength noted by an accurate milliampèremeter. The

[1] The quantity of wire that was originally used, both when wire alone was employed and wire reinforced by galvanism, was far in excess of that necessary to reach all portions of the sac-cavity, and could not but be inimical to cure. The cases in which a moderate amount of wire was used, as in Loretta's (6 feet) and Morse's (4 to 5 feet), resulted in cure. Loretta's case, an abdominal aneurism the size of a fœtal head at term, contracted to the dimensions of a walnut with obliteration of sac-cavity. Death resulted from rupture of the aorta below the sac. In Morse's case ("abdominal aneurism the size of two fists") all indications of aneurism had disappeared within two months, a hard nodule replacing the pulsating tumor. In the cases in which the combined treatment was employed, the amount and character of wire, duration of application of electric current, and polarity employed are as follows:

Corradi (large aneurism, ascending part of the aortic arch): One and one-half feet No. 30 annealed wire, material not mentioned; anode active; sixteen elements; twenty-five minutes.

Barwell (large aneurism, ascending and transverse part of the aortic arch): Ten feet finest steel wire; anode active; 10 milliampères, one and one-sixth hours.

Roosevelt ("aggravated, thoracic, aortic aneurism threatening death"): 225 feet fine steel piano wire; polarity not stated; 25 milliampères one-half hour.

Abbe ("a rapidly advancing thoracic aneurism at the root of the neck"): Cavity four by five inches; 100 feet of catgut first introduced; nine days subsequently 150 feet fine wire (material not stated); anode first active pole; 50 milliampères one-half hour; cathode active pole second half hour.

Kerr (fusiform thoracic aneurism): Six feet drawn silver wire; anode active; fifty minutes.

Kerr (aortic intra-pericardial sacculated aneurism): Ten feet drawn silver wire; anode active; one-half hour.

Rosenstern (aneurism, ascending part of the aortic arch): Two and one-sixth feet moderately thick softened silver wire; anode active; thirty minutes.

D. D. Stewart (enormous thoracico-abdominal aortic aneurism): Two and one-half feet No. 28 silver wire; anode active, 70 milliampères one hour.

D. D. Stewart (innominate aneurism): Ten feet fine gold wire, No. 30; anode active, 80 milliampères one and one-quarter hours.

Hershey (innominate aneurism): Gold wire, No. 28; attempt to pass ten feet, but through kinking of wire two and one-half feet only introduced; 40 to 70 milliampères for sixty-five minutes; anode active.

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increase is gradual for a few moments until the maximum strength supposed to be required is reached. It is maintained at this until the approach of the end of the session, and then gradually diminished to zero; after which the wire is separated from the battery, the needle carefully withdrawn by rotation and counter-pressure, and the released external portion of the wire gently pulled upon and cut close to the skin, the cut end being then pushed beneath the surface. This latter procedure is facilitated by using care in the introduction of the needle to first draw the skin at the site of puncture a trifle to one side, in order to procure a somewhat valve-like opening.

Experience has shown that the current's strength must be rather high—from 40 to 80 milliampères—and the session long—from three-quarters of an hour to one and a half hours. Thus used the following effects may be expected: As before remarked, the mere introduction of coiled, snarled wire without the conjoint use of galvanism, if practised judiciously, is in itself a method of value, since the presence of wire, if engaging all parts of the sac, acts both as an impediment to the blood-stream and at the same time offers to the eddies set up multiple surfaces for clot-formation. Hence this method had more to commend it than that by mere galvano-puncture with needles. By galvano-puncture, although firm coagula are produced, they are of such trifling dimensions and engage such small areas of sac-wall that, without impeding in the least the blood-current, their dissolution rather than their accretion quickly follows. By the application of a strong galvanic current through coils of wire so disposed that all areas of the sac are reached, it follows, without exception, as has been noted in all recorded cases, that consolidation by virtue of clot-formation is promptly and invariably produced. The solidification is rapid and is generally manifest before the end of the electrical session, through changes apparent to the eye and hand, in the pulsation and in the degree of consistence of the sac-wall. These changes become more decided in the course of a few days, until after a time in the most favorable cases a hard nodule, with a communicated pulsation only, replaces the previous expansible tumor. This was the history of four of the ten cases now recorded;

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that of Kerr, that of Rosenstern, the second case of my own, and the case of Hershey, and partially so in the case of Barwell, of Roosevelt, and in the first of my own, all of which latter cases were totally beyond the slightest hope of cure at the time of treatment, as was also the case of Abbe.[1]

A striking demonstration of the power of this method to promote clot-formation is shown in my second case, the specimen of which I now show you. In this, as stated, ten feet of fine gold wire had been passed and a current of 85 milliampères employed for one and a quarter hours. Four weeks after this procedure a needle of quite large calibre was thrust into the sac to a depth of two inches in several situations, in which at the time of operation blood spurted at its introduction when apparently only beneath the skin. The needle in the second attempt was found to firmly engage the clot, though thrust perpendicularly up to its hilt in the sac. It could not be circumducted save with effort, and escape of even a drop of blood at any depth did not occur; nor was the needle or wire (which last had been attempted to be reinserted through the needle), when withdrawn, blood-tinged. This beautifully demonstrated the apparent complete solidification of the aneurism.[2]

One other effect possessed by the method in producing clot-formation should not be lost sight of. It is that through portions of the coils of wire, which must in small sections lie in direct contact with the sac-wall, under the current's influence an electrolytic effect is produced on the endothelial lining of the sac, such as Macewen has demonstrated is highly favorable to the subsequent deposition of leucocytes derived from the vessel-wall and by segregation from the blood-stream, resulting in the formation of organizable white thrombi, from which vascularized fibrous tissue readily springs. From these wall-thrombi, which in a fair number, if not in all cases treated by this method, are likely to result, organization may rapidly extend to the red thrombi formed directly about the centrally disposed wire, and this solidification and organization of the sac promptly occurs.

[1] Details of these cases will be found in my first and second papers.

[2] An account of the exploration of the solidified sac with the needle is given in the second paper (American Journal of the Medical Sciences, August, 1896).

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DISCUSSION.

DR. H. A. HARE: I have a special interest in this report, as the patient was in my own wards in the Jefferson Hospital during the two terms of my service, last year and the year before. There was everything in the case to make an operation unfavorable; there was chronic endarteritis, the aorta was diseased, and there were serious heart-changes, and the effects of association of syphilis with alcoholism. I have never seen a case of aneurism of the aorta or of the innominate in which the patient was made so very comfortable, for this man even possessed the ability to walk around the streets. He was at the Philadelphia, the Jefferson, and the Polyclinic Hospitals, attending the clinics up to within a few days before his death. I hope that the Fellows will take notice that this case has had an arrest of the development of the aneurism by the method carried out by Dr. Stewart. This method extends the possibilities in such cases to a degree that I had not thought possible. He did not perish from the disease, but from another affection. At the examination the clot in the vessel was perfectly formed. This man had a lump extending above the clavicle about the size of my fist after the operation, and at a spot where we thought there was a softening Dr. Stewart made a puncture and found that there was no softening, but the cavity contained a firm clot. The man lived for three years in comfort after the operation, and his death was due to another cause.

DR. JOHN ASHHURST, JR.: This case seems to me a very interesting one, and I have no doubt that Dr. Stewart is right in his suggestion that the passage of the galvanic current through the introduced wire effected some change in the walls of the sac which assisted the coagulation and rendered the clot firmer than it would have been otherwise. It is, of course, well known that many attempts have been made to cure aneurisms by the introduction of foreign bodies into the sac, but almost always with disastrous results, and that the use of galvanism by itself has also proved unsatisfactory; but in the combination of the two methods—first inserting a coil of fine wire and then passing through it a galvanic current—there appears to be more hope of benefit, doubtless because thus both the sac and its contained blood are made agents in the cure. The cause of failure after other plans of treatment, as well as after distal ligation, appears to be that no matter how firm or how large a clot may be formed, a thin stream of blood still finds its way between the clot and the sac-wall, and thus, in spite of coagulation of its contents, the aneurism continues to grow, the sac becoming constantly thinner by expansion, until ultimately death occurs either from pressure or from rupture; but in Dr. Stewart's case the specimen shows that the cavity of the sac was as completely obliterated by the contained clot as it could have been by either the Hunterian or the Antyl-

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lian operation; in fact, as far as this portion of the artery was concerned, the circulation was as completely obliterated as it could have been even by extirpation of the whole aneurismal sac.

Another point of interest, it seems to me, is the confirmation which this specimen gives of the commonly received doctrine that the clot is formed from the blood in the aneurism as by the process of whipping, and not, as taught by W. Colles, from the sac-wall; for although the clot here is most closely approximated to the wall, it is in contact only and not organically adherent.

In referring to the prolongation of life after operations for innominate aneurism, I may be permitted to mention a case under my care some years ago, which was reported to the College by Dr. Wharton. In this case I tied simultaneously the right carotid artery and the right subclavian in its outer portion, the patient recovering with disappearance of the external signs of aneurism, and being enabled to resume his occupation, that of a gardener, which he continued to pursue, remaining in good health for nearly five years and a half and surviving the operation for seven years and four months—the longest period during which any patient is known to have lived after such an operation.

Extirpation of the whole aneurismal sac, a revival of the "old" or Antyllian method in its original form, has recently been recommended by Dr. Halsted, of Johns Hopkins Hospital, and has been brilliantly successful in his own hands—notably in a case of subclavian aneurism—and in those of a few other surgeons. Such treatment would be manifestly inapplicable to an aneurism of the innominate artery, but the interruption of the circulation effected by Dr. Stewart in the case reported to-night appears to have been quite as complete as could have been accomplished by extirpation itself.

DR. A. A. ESHNER: There are only two points that I would like to refer to. One is that Dr. Stewart's patient died not in consequence of his innominate aneurism, but as a result of independent disease of a central vessel. The other point is that the circulation was only gradually cut off by the method of treatment employed, and the cerebral disturbance was less than if ligation of the aneurism, with excision, had been performed. As is well known, sudden cutting off of the supply of blood to the brain may be attended with loss of consciousness, convulsions, and possibly even a fatal result.

DR. STEWART: I am not a surgeon, and of course should not attempt to excise an aneurism. Some years ago, while very much interested in electricity, it occurred to me to adopt with modifications this method of treatment in a hopeless case of extraordinarily large aneurism of the thoracic and abdominal aorta, which had caused such extensive erosion of the vertebræ that the spinal cord lay exposed in the sac. When I reported that case before the College I recall that Dr. Meigs, whom I see here to-night,

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spoke rather deprecatingly of interference in such cases. My experience in that case, the result of the treatment of which was decidedly favorable, enabled me to repeat the method with even better technique in the case I now report with the favorable result shown.

DR. ARTHUR V. MEIGS: I rise only because I have been quoted as having commented upon the subject on a former occasion, although I do not remember it. I was resident physician in the Pennsylvania Hospital a number of years ago, when Dr. Levis introduced horse-hair into an aneurism. The case was reported as cured in the *Philadelphia Medical Times*. A few weeks later the man died, and I was present at the autopsy. We found about as much horse-hair in the lungs as in the aneurism, which was one of those without a well-defined wall. The difficulties of diagnosis have not been well brought out in the discussion, and they are often very great in cases of intra-thoracic aneurism, and of the utmost importance. I would like to supplement what I said upon the subject previously by a word of comment on the case reported in the paper: The man was incurably diseased and was not cured by the operation. There was another aneurism, only discovered after death, which was not treated, and which, with the other organic disease with which he suffered, must have caused his death.

DR. STEWART: I should like to ask Dr. Meigs this question: Suppose he had an aneurism which was incapacitating him, or at least seriously crippling his energies, would he not accept a mode of treatment which in all probability would be curative, even though he also had a second incurable, though less incapacitating but more chronic malady? I am sure I would. As is well known, the late Hilton Fagge had an aneurism which he carried for several years; but despite this continued in harness, doing good work. Had a mode of cure such as this been offered him he would doubtless have willingly grasped it. The aneurism in the case reported here to-night, the specimen of which is before you, was undoubtedly *cured* by the operation. The second aneurism, spoken of by Dr. Meigs, consists merely of a fusiform dilatation of the aorta. This was symptomless, and had absolutely nothing to do with his death, which was caused by cerebral thrombosis, the result of chronic endarteritis.

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THE RELATIONS OF NERVOUS DISORDERS IN WOMEN TO PELVIC DISEASE.

[Discussion held February 3, 1897.]

DR. BARTON COOKE HIRST: Of all the lessons my work has taught me, I value none more highly than those which I have learned in the study of the pelvic organs of neurotic and neurasthenic women. I have had the good fortune for a number of years to examine many of the cases in the large neurological service of the Orthopedic Hospital, and by the kindness of Dr. Mitchell and of others even a larger opportunity has been afforded me in consulting and in private practice to observe the relationship between nervous disorders and pelvic diseases in women.

I find that as the result of this experience certain propositions have formulated themselves in my mind to which I hold as valuable guides in practice.

1. A neurasthenic woman, her family, or some one of her physicians will almost surely impute the nervous symptoms of the patients to disease of the sexual organs.

2. A large majority of neurasthenic patients, I should say about four-fifths, give an entirely negative result on a pelvic examination except for the ill-development of the sexual organs, which is such a constant accompaniment of a feeble nervous system in women.

3. In a small minority of neurasthenic cases the nervous disorders do seem to have had their origin in some pelvic lesion, and will slowly disappear when the pelvic disease is cured; but it is usually necessary to unite with the gynecological treatment a "rest-cure," and if the cure of the pelvic disease is postponed too long it will have no influence whatever on the neurasthenia.

I believe that I can best explain what these propositions mean to me by citing a few illustrative cases, with brief comments under each head.

Cases of Neurasthenia or Hysteria attributed to Pelvic Diseases that do not Exist. Case of Miss S. Examined at the request of Dr. John K. Mitchell. Aged twenty-five years; difficult labor at her birth, and removed from her mother with forceps. Child in bad condition for twenty-four hours with a deeply indented head. A little more excitable and nervous than her sisters

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in early childhood. She has double inguinal hernia. She has two sisters who menstruated at the age of thirteen years. She herself has never menstruated. Three maternal aunts never menstruated in their lives. They married, but never bore children. They each had double inguinal hernias. They were strong, hearty women, without nervous manifestations. In this girl there has never been any menstrual molimina. There is a slight leucorrhœa at odd times; not regularly once a month. The girl herself thinks that there is always some leucorrhœa, but there is no increase of it at regular intervals. Urination not abnormally frequent; bowels usually constipated. Many queer nervous manifestations and perverted ideas, which apparently reach the grade of insanity.

She has been told by a female physician that all her nervous symptoms are traceable to "womb-disease," and after a vaginal examination this physician told the patient and her family that the nervous disorders could be cured by local treatment of the womb.

Pelvic Examination: The vagina is a rather shallow cul-de-sac, not an inch deep. No trace of cervix, womb, tubes, or ovaries in a combined rectal and abdominal examination.

Diagnosis: Congenital absence of all the internal sexual organs.

It is scarcely necessary to add that there was no disease of the pelvic organs which could be held accountable for the girl's nervous disorders.

Dr. Mitchell tells me that the patient is rapidly improving under his treatment of her neurasthenia. There are two explanations for the physician's mistaken statement in this case. One is that she really believed the patient had some pelvic disease, and, firmly impressed with this idea, that she really thought she discovered what was in her mind during the vaginal examination. There is scarcely a week in which I am not called upon to correct such errors. If our discussion serves, even in some degree, to prevent these mistakes in general practice it will indeed serve a good purpose, for they have many and serious ill results. They injure the physician's reputation and lessen his influence. They fasten in the minds of hysterical women ideas that are extremely difficult to dislodge, but which must be dissipated before the hysteria can be cured; and they lead to injudicious and unnecessary local treatment that very often establishes an inflammatory pelvic disease which did not exist when the treatment was begun. All gynecologists of experience will agree with me, I think, that this is a widespread evil in medical practice, often with lamentable and sometimes even fatal results.[1]

There is another possible explanation for the physician's conduct in the case just cited. She may have deliberately deceived the patient and her family for the large sum in the aggregate to be gained by a long-continued local treatment. I regret to say that occasionally I encounter instances

[1] I have seen in one week two cases of pyosalpinx, requiring abdominal section, that had their origin in unnecessary intrauterine treatment.

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of such rascality invariably successful, for a time at least, with these most gullible of all patients—hysterical women.

With your indulgence, Mr. President, I should like to describe one more instructive and typical case under my first heading—that of a Miss S. I received, some months ago, a letter dated from a town in the interior of the State, from which the following extracts are made: "I am forty-one years of age, have never been married, have been confined to bed seven and a half years with uterine troubles. I have displacement, flexion, and chronic inflammation, and much of the time acute inflammation. My stomach and bowels are very weak and trouble me very much. I had nervous prostration last April, and my nerves are still very weak, and I tremble a great deal." "I am very debilitated and cannot sit up at all. I shall be obliged to stay in the hospital several weeks after my arrival, and the doctor advises me to have an operation." A few weeks later the patient arrived in the Howard Hospital. She told me it would be impossible to make a vaginal examination for three days, as she had used a very powerful astringent to keep up her womb on the journey, and that in consequence the vagina was so contracted it would not be possible to introduce even one finger for several days. I humored her whim and waited, meanwhile learning her history. From a long, rambling account I recollect the following statements, made with the utmost conviction, and based, she said, on what her physicians had told her. Every time she stood erect or sat up the womb turned upside down, and could only be replaced by her physician's manipulations. The womb was prolapsed and threatened to emerge from her body at any moment. It was bent on itself and was ulcerated. Her ovaries were diseased, and so was the bladder. Sometimes she could not hold water; at other times she could not pass it. She had been told and implicitly believed that nothing could cure her but the removal of the uterus and the ovaries.

I made a careful examination under ether of the pelvic organs, and of the bladder with an endoscope. Everything was perfectly normal and healthy, except that the sexual organs were ill-developed. On the following day, when I told the woman emphatically that there was nothing wrong with her but hysteria, she viewed me with the utmost resentment, and was as indignant as though I had taxed her unjustly with some disgraceful vice. She was at length persuaded, however, to transfer herself to the nervous ward in the hospital, under the care of Dr. John Madison Taylor, who finally sent her home in a condition best described by herself in the following brief extracts from a letter recently received: "I can walk all around the house and wait upon myself" "I went to church yesterday and walked down the aisle without assistance. It was the first time I had been to church in eight years, and I could not have been more warmly welcomed if I had risen from the dead," etc.

During this woman's neurological treatment she had several relapses to

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her old belief and declared her conviction that she never could be cured without an operation.

One more illustrative case to show how little pelvic disease of a marked character may have to do with nervous symptoms that apparently depend upon it:

Mrs. B.; married three years; pregnant once; child one year old; labor instrumental; puerperium normal. Sickness returned four weeks after delivery, and has recurred regularly ever since, but the interval between the periods is five to six weeks, and the discharge is scanty. Since the childbirth there has been severe pain in the back and left groin, which is worse just before the menstrual flow. There is constant and profuse leucorrhœa. Shortly before she became impregnated epilepsy appeared after she had been sick in bed with nervous prostration two weeks. The spasms have ordinarily returned once in two months since then, but have been sometimes absent as long as five months. They have almost always appeared with the severe pain in the groin and back that immediately preceded the menstrual flow, although rarely the spasms occurred independently of menstruation.

Examination: Left tube greatly distended, infiltrated, and firmly adherent; ovary prolapsed, adherent in Douglas's pouch, enlarged and exquisitely sensitive.

Diagnosis: Left-sided pyosalpinx. Operation recommended for the cure of the pelvic pain and disease with an idea that the epilepsy and other nervous disturbances would be benefited. Accordingly a large hydrosalpinx with dense adhesions and a diseased ovary were removed without special difficulty or complications.

Perfectly normal recovery from the operation, with entire disappearance of all pelvic pain and the pain in the back, with gain in weight and apparently a good effect upon the spirits; but the epilepsy in the year that has elapsed since the operation has become steadily worse, and the woman is now insane.

It is not necessary to dwell upon the last proposition—that occasionally the profoundest nervous disturbances appear to have had their origin in the long-continued, unceasing, and tormenting irritation of some pelvic lesion, and that they disappear when the pelvic disease is cured. Physicians in general are only too well aware of the fact, and need no further instruction on it. It would be possible under this head to cite, from my own experience, some striking illustrative cases of reflex pains, of melancholia, of hystero-epilepsy, but it is unnecessary.[1] I feel that my small contribution

[1] I find occasionally in my consulting practice that the general practitioner makes the mistake of overlooking some pelvic lesion and of treating in vain the reflex nervous and other symptoms springing from it; but the opposite error, in my experience at least, is much more common. A safe course, making mistakes of both kinds impossible, would be to procure from a specialist a report of the pelvic condition in the case of every woman with obscure nervous or other symptoms, traceable in any way, or imputed by anyone interested in the patient, to pelvic disease.

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to the study of the subject under discussion will be most useful if it conveys only the lesson that nervous disorders in women are to be explained usually *not* by pre-existing pelvic disease, but by a weakly organized nervous system unable to cope with the ordinary vicissitudes of life or by some derangement of the nervous organism itself.

DR. E. E. MONTGOMERY: Frequently in passing along the streets I observe a sign which reads, "One Cause and One Treatment for all Diseases." This is evidently a case of mature specialism. Charges are not infrequently made against gynecologists that they refer all diseases of females to some disorder of the genital organs. The paper with which Dr. Hirst has opened this discussion shows that he is one who has recognized that disturbances of the pelvic organs are not the sole cause of nervous diseases. It is, however, important to recognize and determine the exact relation of nervous disorder to an existing pelvic lesion. Not infrequently we find patients treated for pelvic lesions in whom the symptoms are thereby aggravated and the patients suffer as much from the treatment as from the disease. On the other hand, we find many cases who are subjected to rest-treatment, and without effective result, for the reason that there is a local lesion which manifests itself as soon as the patient resumes her normal relations. In some cases the returning symptoms would be aggravated. It has been my fortune to see a number of cases subjected to rest-treatment for various neurotic conditions in whom there have been found distinct pelvic lesions, such as pus-tubes, hydrosalpinx, laceration, or a retrodisplacement. This neglect of consideration of the pelvic lesions, however, seems to be more marked on the part of those who treat mental diseases. In many of the institutions for the treatment of the insane the proper examination of the pelvic organs is neglected, often, possibly, for the reason that it is difficult to conduct them. While I would not for one moment claim that the existence of increased nervous phenomena at the menstrual period is an absolute indication that the pelvic disease is a source of trouble—for we recognize that all disorders are aggravated at that period—yet I do feel that a woman suffering from mental disease is entitled to a careful examination, and, where a lesion of the pelvis exists sufficient to justify treatment if she were sane, such a patient should have the benefit of the treatment, even though insane. One difficulty which we will have to combat is that the diseased condition has frequently existed so long that structural changes have taken place in the organs which were irritated in a reflex way originally. A case recently came under my observation—a woman who had been insane for two years had been confined in an insane asylum on account of her tendency to commit suicide. I saw this case in consultation with Dr. Chase, who informed me he was unable to find any central lesion of the nervous system as a cause. On examination it was found she had a fibroid tumor which filled up the pelvis. She

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was placed in a hospital, the uterus removed, and the insanity disappeared. For two years subsequently no mental symptoms were present. She was able to take care of herself and to enjoy life in comfort. A few months ago, however, she again developed mental derangement, became exceedingly melancholy, and declined to eat. Three weeks after the occurrence of this relapse she died. This, in my judgment, was a patient who should have had earlier treatment, and it is possible that more prompt relief would have saved the production of structural changes in her brain which made her more susceptible to the recurrence of the disorder. Another patient came under my observation who had been insane for four years. The ovaries, which were quite large, inflamed, bound down, were removed. Three weeks after the operation her mental symptoms disappeared and she found herself in as good health as she had been prior to its first occurrence. She was able to secure a position as matron of a public institution, which position she retained for a year. She then had a relapse, and, I believe, is still confined in the Norristown Asylum. Both these cases seem to me to illustrate the importance of early treatment of a local lesion. Its neglect undoubtedly had such an effect upon the brain as to produce changes which rendered the individual more susceptible to subsequent recurrence. In the consideration of these patients, then, I would again urge that every insane patient in whom symptoms exist which attract attention to the pelvis as a possible source or cause of the disease should be subjected to examination. Where lesions exist of such a character as to demand treatment, an attempt should be made to give relief, although the patient be insane. No patient, simply because she is insane or has an aggravation of her symptoms at the menstrual period, without lesions that can be demonstrated by physical examination, should be subjected to operation.

Dr. George Erety Shoemaker: There are no patients more difficult to deal with satisfactorily than the representatives of the great middle class who come from the small country towns with marked hysterical and neurasthenic conditions combined with pelvic diseases. I take it for granted that reputable gynecologists are not given to removing healthy organs for nervous symptoms or for pain only. The problem which presents itself, especially in the class of cases to which I have referred, who cannot live a life of idleness, is how to cure the patient, and this demands much thought. I frequently hear men say, in reproach of surgeons, that such and such a patient has had her ovaries removed; that she is very decidedly hysterical or neurasthenic, and that any man should have known that the removal of the ovaries would not cure her. It seems to me to be forgotten by such a critic that there is no evidence whatever in his hands that the ovaries were not seriously diseased, and that there was not present a neoplasm, and that the operation was not undertaken as simply one factor in endeavoring to cure the case. When these nervous cases come to us and we find that there

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is a minor pelvic lesion, we know that if we put them to bed, give them massage, electricity, and forced feeding, we will practically cure them *for the time being*. Many such patients are discharged from hospitals marked "cured" who go home with their pelvic lesion unchanged; while the mere resumption of the upright position and the old habits of life, including the irritation of the displaced uterus or the moderately inflamed tube or appendix, will put the patient where she was before. A man is false to his trust who does not endeavor to cure his patient permanently; but it by no means follows, as seems to be inferred by some men, that oöphorectomy should be done. Frequent criticism is made as to the size of the specimen on the table after an operation. In some cases where the removal of the appendix or tube seems to result in the removal of a very small specimen the observer loses sight of the great importance of the organized inflammatory infiltration which surrounded this organ, and that it may have been the starting-point for attacks of localized peritonitis which have for years kept up the invalid state. A testicle incarcerated in the inguinal canal may require removal just as much when small as when large. Varicocele causes hypochondria in men at times, but only because it is a disease of the sexual apparatus and not because it is large. The necessity for the removal of an appendix destroyed by inflammation rests not upon the size of the appendix, but upon its condition.

When a case presents itself with an important lesion, a conscientious man is obliged to try to remove it. Among the hopeful methods in modern gynecology is the permanent cure of those retroversions which cause trouble. If these are simple, no treatment is necessary, but if they are complicated, something must be done. One of the most important things to secure is the restoration of the ability to take exercise. Patients will often become comfortable under passive exercise and rest; but they must be put in a position where they can take exercise by themselves, or they will not remain either comfortable or free from nerve-symptoms. Inability to take exercise without suffering at every step or from every jar in street-car riding tends to keep up the idea in the patient's mind that she is suffering from some important disease, although you may assure her that she has no disease until the end of time. Hence arises the necessity for the cure of inflammatory conditions in bladder, uterus, tubes, and ovaries. Where an infected tube or ovary has become the focus from which start repeated attacks of pelvic peritonitis this focus must be removed, regardless of its size; yet how many physicians who *never examine their cases* will treat such conditions for supposed ovarian neuralgia or neurasthenia, diagnosticating the inflammatory attack itself as typhoid fever of obscure type or as suspected tuberculosis. It is useless to attempt to cure cases of this kind, unless minor in degree and recent in origin, by rest alone, with or without the use of suggestion and a high type of moral instruction. When they resume their old life, which usually includes much

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stair-climbing and the care of children, their old troubles return, the real aches soon breed a large progeny of false aches, and within a year the patient is as bad as ever—a nervous wreck, peevish, hysterical, and helpless. What such a patient needs is never double oöphorectomy of sound organs for the sake of inducing the menopause and abolishing dysmenorrhœa. She needs careful, intelligent treatment of the organs which are diseased, with possibly the surgical removal of tissue hopelessly diseased; but, above all, every effort must be made to preserve or restore her natural functions and to disabuse the mind of the idea that there is any ovarian or uterine trouble. This last can only be done by making her comfortable. If, after the first examination, no disease is found, all local treatment must be carefully avoided and the case then treated along general lines, just as aches or pains in any other part of the body would be treated. Here lies the remedy for "rest-treatment" and suggestion.

Frequently patients will state that they have been told by an operator that their ovaries must come out, when no such statement has been made. This is a matter of experience which every surgeon can appreciate. A most cautiously guarded preliminary opinion, if it includes the suggestion that treatment may fail to cure a diseased condition, after which the question of operation would have to be considered, is a verdict in the minds of many a thoughtless patient. The writer recently performed hysterectomy for cancer on a patient who casually told him that a distinguished neurologist, a Fellow of this College, had told her that she had cancer of the liver *six years ago*. Not only did he not say so, but I did not believe that he did. Yet I have heard that gentleman condemn, unheard and unknown, some surgeon who had operated on a nervous case, taking it for granted that the surgeon had overlooked the true character of the disease.

This same case of hysterectomy for cancer is sixty years old, and has had periods of mental depression almost amounting to hypochondria, with a habit of wandering off unexpectedly from a nameless unrest and desire to "go away from herself." These symptoms antedated her operation, from which she is just recovering. I have never told her that she had cancer, to save the mental effect. I venture to prophesy, however, that if she does not die too soon from recurrence of the growth she will fall into the hands of a neurologist for those nervous symptoms, and that he will be an unusually charitable man if he does not discover in her a new example of serious mental disease caused by removal of the sexual organs. He may even suppose that the hysterectomy was done for the hypochondria, if he admits this preceded the operation. My own opinion he will never know, which is that the physician who would allow his patient to bleed excessively for fifteen years from a benign growth, as in this case, with all the mental agony and dread of cancer that the patient says she has endured, is responsible for the hypochondria, if not for the malignant disease finally engrafted on the benign.

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Many patients with grave hysterical conditions have been restored to health by the removal of pelvic disease at my hands, followed by other treatment. There are many grateful letters now in my possession testifying to their recovery. The operations were never done to cure organic nerve-lesions, nor were they ever normal oöphorectomy, but they have been done to remove tumors, to take away pus-sacs, to hold up diseased uteri, or, in other words, to remove some active factor which had either undermined the patient's vitality by sepsis, bleeding, or constant irritation, or which had prevented her taking the exercise necessary for the health of the nervous system. Where actual disease of the sexual apparatus is present, it seems hard to overlook the enormous mental effect, and the causal relation through a chain of correlated factors, such as worry, sedentary life, constipation, lithæmia, and the like, with many of the neurasthenic conditions so common in women of the present day.

DR. CHARLES P. NOBLE: My experience bears out what has been said by Dr. Hirst, that there are many patients who are supposed to have disease of the sexual organs who are suffering instead from diseases of the nervous system or from imperfect development plus diseases of the nervous system. Arrested development is the fundamental cause of many cases of nervous diseases simulating diseases of the sexual organs in women. I have long observed that women having imperfect development of the sexual organs have an unstable nervous system, and that, as a rule, they are not vigorous or normal women. Many of them have had chlorosis in girlhood. Some years ago I sent several patients having imperfect development of the sexual organs to Dr. Harrison Allen, and was much interested to learn that there was an irregular and imperfect development of the organs of the throat and of the anatomical structures in general. It is hardly necessary to point out that cases belonging to this group should be treated by general measures. The proper time to treat such patients is when they are children and young women. By restricting their hours at school, by giving general tonics, by curing anæmia, and, above all, by securing active exercise out-of-doors, much can be done to increase the development of such patients and to restore them to approximately a normal condition. After maturity has been reached very much less can be accomplished. I have seen early marriage and maternity prove of great service in some cases, but in others no such desirable results have followed.

On the other hand, I have seen very marked functional disease of the nervous system cured by operations on the pelvic organs. In three cases hystero-epilepsy, which had persisted in spite of treatment at the hands of neurologists, disappeared after the removal of diseased uterine appendages. These patients remain well, although several years have elapsed since the operation. I remember a typical case of a reflex neurosis cured by a perineal operation. The patient suffered from aggravated dyspeptic symptoms,

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which had resisted well-directed treatment. She had a moderate laceration of the perineum, and as a result an irritable condition of the levator muscle. The pelvic organs were well supported, because what was left of the levator muscle was doing excessive work. The conditions were entirely similar to those present in muscle-strain as found in certain eye conditions. After the restoration of the perineum the reflex symptoms promptly disappeared, and this patient has remained well for several years. The case was well studied by her family physician, Dr. Radcliffe Cheston. I also know of cases of insane patients having pelvic disease who were operated upon, and after the cure of the pelvic trouble the insanity disappeared.

Not intending to take part in this discussion, I have not looked up the records of my work, or I could add very much to what has been said. My experience with cases that have been in the hands of both gynecologists and neurologists has been very unsatisfactory. I remember seven cases having disease of the sexual organs with very marked nervous symptoms that were treated by the rest-cure for months. None of these patients were in the least benefited, but were subsequently obliged to submit to operation. The position taken by many neurologists toward operations upon the sexual organs of women is unfortunate for the cure of this class of patients. Remarks prejudicial to operative treatment act by suggestion upon neurasthenic and hysterical patients. Our friends, the neurologists, should bear this in mind. In my opinion, the rule to guide the surgeon in cases having pelvic disease with nervous complications should be to operate upon all cases in which the disease threatens life or breaks down the general health, irrespective of the nervous symptoms. I have had no cause to regret this course myself, and, on the contrary, the nervous symptoms have improved with the gradual restoration of the patient's general health. On the other hand, when the local disease does not threaten life nor seriously interfere with the patient's comfort, it is best, if possible, to improve or cure the nervous complications before resorting to operation. It is well to call attention to the fact that the neurologists see only a small percentage of operative cases, and that their views on the whole subject are apt to be tinctured by the small and exceptional class which comes under their observation. It would be as logical to judge of a man's success in practice by considering only patients that have been treated by him who consulted other physicians—that is, to consider only the failures, the partial successes, or the evidence of patients that have for one reason or other been dissatisfied, and to leave out of consideration entirely the very much larger percentage of cases who are entirely satisfied with the results of treatment, and hence do not consult other medical men. It seems to me that this method of arriving at conclusions has been followed by some of our neurologists.

DR. S. WEIR MITCHELL: I beg to say to Dr. Shoemaker that no one ought to expect rest-treatment to do everything for everybody. No one

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thinks that this is the way to use the rest-treatment. I constantly feel it necessary to have pelvic examinations made of women before they finally leave our hands, and of course do so.

I am quite sure that the success of surgical operations would be far greater if the women had had previous rest-treatment, as I have observed, when a grave operation follows this treatment, that the patient gets well sooner. I can produce detailed notes of some cases in which Sims and Goodell declared that the ovaries must be removed, and yet every one of these cases were subsequently cured by the rest-treatment. Four of them, two of whom were sisters, have since married and have had children. Dr. Montgomery states that the insanity in one of his cases was cleared up within three weeks after the operation. In melancholia and in some other forms of insanity, however, it is not rare to find the trouble cease after an operation. I have in mind a case which apparently got well immediately after an operation for removal of the breast. Another case of profound melancholia, with a tendency to commit suicide, apparently made immediate recovery after an operation for hemorrhoids, and has had since then no sign of the grave trouble which pre-existed.

As I understand the subject for discussion, it is an inquiry as to how far nervous diseases in women have their origin in pelvic disease.

This discussion will, of course, take many directions, and I could perhaps with profit offer the Fellows a long experience of many forms of neurosis associated with pelvic disease and cared for by a combination of medical means with the aid of mild local and mechanical treatment. This has, however, been so often and so completely done in the past that I prefer rather to consider with the main subject how far the increased use of surgical methods in dealing with pelvic diseases has been an advantage.

I have not had time to go far in either direction. I shall therefore fall back upon the large general knowledge which a man stores up in his mind as the result of years of thoughtful experience; and I shall not attempt to be statistical or to report cases at length.

I shall consider the chief neuroses. I shall ask if they depend on pelvic functions and how far surgical destruction of function and removal of pathological tissue is therapeutically of use. I shall not consider pain nor asthenic states.

I shall deal in this relation with epilepsy, insanity, and hysteria—three groups of disease which medical men for a long time have been apt to refer to disease of the uterine organs as a parent source.

And first, as to epilepsy. There is a great deal in the history of this condition to justify this attribution. Thus, epileptic attacks are apt to return at the menstrual period with greater frequency than at others, and in certain persons (epileptics) the attacks never occur save when they appear either just before, just after, or during the monthly flow.

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In all such cases both physicians and surgeons have been tempted to arrest, by oöphorectomy, this apparent cause of trouble, even where the organs were healthy, and they have been, of course, still more ready to interfere where the epilepsy was menstrual and the condition of the pelvic organs seemed to make oöphorectomy proper.

This seeming relation of disease to a function has led physicians and surgeons to think that to end the function will end the disease. Therefore many normal ovaries have been removed; with more reason, with larger hope, and with equal disappointment numberless diseased ovaries have also been taken away.

In no case seen by me has ablation of ovaries and termination of menstruation cured an epilepsy.

I have never sanctioned such operations where the appendages were sound. I have agreed thrice to these operations in epilepsy with such pelvic disease as of itself would justify oöphorectomy. In all three, after some delay, the fits returned and were in no way permanently aided.

I recall, as an illustration, a case in which there were epileptic states of great severity only at the menstrual epoch. The ovaries were apparently sound, but as two physicians and a surgeon were against me, my opinion was not regarded and ovariotomy was performed. The attacks, which had been daily, stopped for seven weeks after the operation, and the case was hastily spoken of as a great triumph. The patient, however, then became worse, and permanent loss of mind resulted. Such temporary cessation of epileptic attacks is too well known to the neurological consultant to call for remark from me. Change of environment, any great alteration of the habits of life, moral influences, and the like may suddenly and for a time put an end to the fits; removal to a hospital will often do the same; change to a country life for a city patient, or the reverse for a country patient, may all exert a temporary effect. I saw a number of cases during the war where life in camp postponed or lessened the fits, and two in which it put an end to an epilepsy.

I think that surgeons should be exceedingly careful as to operations for the disorder in question. They are often lured into operation for a trouble in regard to which they alone are asked to give an opinion, and operations are done without medical consultation, which to my mind is one of the great—shall I say surgical?—evils of the present day. The ease of operation, the freedom from mortality, makes that seem of little moment which should in every case receive the gravest consideration. The surgeons here present to-night know that I am not now criticising them. But everywhere through this country men and, I fear, women, are doing an amount of pelvic surgery which I am free to characterize as reckless, and which is too often based on inexperienced individual opinion. In fact, surgery has lost much of that keen sense of responsibility which grew out of the larger mortality of other days.

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The insanities of women present a somewhat different case.

Insanity of various types in women occurs, in which the menstrual period is sometimes the originative and sometimes the determinative cause of the mental disease.

Because an insane woman is usually worse at her period, it is no reason why the flow should be stopped by operation any more than that this measure should be resorted to for epilepsy. That the climacteric puts an end to these disorders is an old delusion; in fact, the change of life, so called, is quite as likely to make them worse as to better them.

In certain constitutions the menstrual period is always a time of mild melancholia, and this disorder may then rise to the grade of suicidal danger in certain persons who are neurotic and, from other causes, in indifferent health. When such cases are extreme it becomes a question whether it may not be right to interrupt even a normal flow from organs which are healthy; but the necessity should be a very grave one.

I recall four cases, three of which illustrate the occasional value of bringing about surgical cessation of the menses in order to relieve insanity. On the other hand, I have seen at least a score where the cases were ill chosen and no good was done by stopping the flow. In each of the four cases of which I shall speak consultations were held with two other men in the profession.

The first case was that of a highly hysterical, cultivated lady, forty years of age, unmarried, as, in fact, were all the cases referred to. After long years of aggravated hysteria she suffered so much from melancholia at her menstrual period that she besought me to give her relief. Operation was positively refused by her family; but five or six years later, as she was getting much worse, she took matters into her own hands, and oöphorectomy was performed by Professor Goodell after I had yielded a reluctant consent. This resulted in remarkable improvement of her physical health, but the insanity became abruptly worse, and has now lasted for twelve years. It should be said that the condition of the organs at the time of operation was such as to furnish some excuse for their removal.

The second case was that of a lady aged thirty-four years; unmarried; highly educated, and possessed of a large estate. Her entire family had died of brain trouble and several had been insane. At the age of twenty-nine years she began to have occasional attacks of hysteria of the aggravated type so common in France, so rare in this country. Later these attacks clustered about the menstrual period. In the intervals she was comparatively well. Soon after I took charge of her she became violently homicidal at the menstrual epochs. The details of this case I have given elsewhere, hence I shall not report it further here. Her condition became so distressing that oöphorectomy was performed, and the organs were found to be as nearly normal in appearance as they ever are. She ceased to flow, but for many months she had slight hysterical attacks without melancholia.

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She was able, however, to spend her summers in the woods, and, having all the advantages of wealth, she gradually improved, until now she has been perfectly well for many years.

The third case was that of a lady situated very similarly. She was about thirty-four years of age when I first saw her. At the time she was thirty her periods began to be accompanied by marked and increasing nymphomania. She was a woman of firm beliefs, great resolution, and singular purity of mind. The condition distressed her deeply, and as it was associated with furious sexual dreams at the time of her periods she implored me to put an end to the menstrual flow. Examination revealed enlarged ovaries and serious tubal disease, the nature of which I do not now recall. Oöphorectomy was performed by the late Professor Goodell. She lost her mental disorder at once and is well at the present time, although it was a year before she recovered fully from the effects of the operation.

The fourth case was one of melancholia at the menstrual period, with maddening headaches, in a woman twenty-six years of age. She had grave disease of the tubes and ovaries, and she suffered severely. As soon as the organs were removed and she ceased to flow she recovered her physical health and slowly lost her melancholia. She never regained the physical health she had before the operation. Although it is thirteen years since she was operated upon, she has at each time of the month when the menstruation should occur the same character of headache as she had before operation.

A great many aggravated cases of hysteria have disease of the pelvic organs which is so apparent as to make recovery by removal of the ovaries and tubes seem probable. A large percentage of these cases are not made better by operation, but, on the contrary, are often made much worse, or else gain nothing on the side of the neurosis.

I do not say that this is always the result, but I wish to insist that we must not expect too much from the knife alone. Were I to criticise further the pelvic surgery of the day it would be in the direction of the absence of prolonged preparatory treatment. Usually a year passes after operations of the nature now considered before full health can be expected, and a great many cases of oöphorectomy suffer for years with pain in the region of operation.

I conclude that epilepsy truly dependent upon normal uterine function or due to abnormal states of the sexual apparatus is rarely (I am tempted to say never) seen. In all my life I have met with but four reflex epilepsies; none were from uterine or ovarian or tubal disease.

I am strongly inclined to think that some at least of the cases classed as epilepsies of ovarian origin are in reality excessively violent hysterical convulsions. Every neurologist here will recall how often he has been called upon to treat a case for epilepsy when the attacks were merely a severe form of hysterical spasms.

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I conclude also that insanity is aggravated by the menstrual epoch, whether normal or not, but that it is very rarely caused by it alone.

Hysteria is not a disease of sex, and it is not often cured by oöphorectomies alone, even by such as are justified by physical disease.

I am inclined to think that post-operative traumatic insanities are more common after pelvic operations than after others. A great deal of uterine and ovarian disease should escape the knife by the use of patient medical treatment. No grave surgery of the pelvis should be allowed without medical consultation.

I further conclude by stating that both Goodell and I have long suspected that insanity after operations is sometimes due to the anæsthetic, since twice we saw it follow operations of a quite trivial nature; but this is somewhat off from the line of this discussion.

DR. CHARLES K. MILLS: The few remarks that I have to make will be based upon personal experience, and are in the main suggested by what has already been said in the discussion. It should first be remembered that pelvic disease or disturbance is sometimes the result of mental or nervous disease. It is, of course, well known that during the progress of melancholia menstrual disorder and even the entire cessation of menstruation are not infrequent.

Touching upon another point brought out by the previous speakers I am inclined to make the assertion that a real epilepsy, a real hysteria, or a real melancholia was never absolutely caused by pelvic disease. These affections are essentially affections of the nervous system, although it is true that pelvic disease, like other serious disturbances of the system, may act as exciting causes in those who are predisposed. The neurotic constitution is the primary and underlying factor. Neurasthenia in some instances seems to be directly traceable to pelvic disease.

Gynecologists should become familiar with certain cases of obsession or monomania. Patients suffering with such obsessions are, in fact, the victims of elementary delusions. A patient may have an obsession as to pain in any part of the body, and I have seen some extraordinary cases of this kind in which the pain was referred to the pelvic organs, but in which most careful and prolonged observation could discover no local disease to account for the pain. Operations are sometimes performed upon these cases only to have the pain return in the same or in some other place. Some of these cases are probably to be ranked as instances of hallucinatory pain. Although it may at first sight appear somewhat foreign to the subject, I might here recall the case of a patient who first complained of pain at the base of one of her teeth. One tooth after another was removed in the vain search for the source of the pain, until she lost every tooth, and the last I heard of her an oral surgeon was trying to find the cause of the pain in the cavity caused by the removal of the last of her teeth. Some of the

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cases referred to by Dr. Hirst in his remarks are of this character—that is, their pains and aches are psychical, in their heads and not in their pelves.

With regard to insanity following operation upon the pelvic organs, I might summarize what I have to say by stating that I can recall at least three distinct forms of mental disorder subsequent to such operations: (1) A form of acute mania; (2) delusional insanity, the delusions occasionally having some reference to the operation; and (3) a form of querulous melancholia. Hysteria with all its morbid train not infrequently remains after operations which have been intended for its relief. In some instances, however, operations may be desirable or even demanded. When pelvic disease is clearly present, operation or local gynecological treatment may do much for the patient, and in very rare instances, even when marked evidences of disease are not present, ovarian operations seem to be beneficial, as when extreme nervous excitement is present at or near the time of menstruation.

The Fellows of the College will remember that some years ago I presented a paper on neuritis and myelitis following labor. Some of the points to which attention was called in the paper are well worth remembering in the present discussion. The probable presence of neural inflammation should be remembered by the gynecologist regarding the cases which come into his hands for pelvic treatment. The nerves of the sacral plexus are not infrequently the subject of a subacute or chronic inflammation. One of the greatest benefits of the rest-treatment is the relief of this inflammation.

Dr. Wharton Sinkler: The subject which has been so ably discussed this evening from the standpoint of the gynecologist and that of the neurologist is one of great interest. If a woman becomes afflicted with a nervous disorder of any kind, the first thought of her friends is that she must have some disease of her sexual organs. This view is so common that at the present day many cases of purely nervous disease are brought first to specialists in women's diseases. I am happy to say that it is now the rule for gynecologists to refuse to treat these cases locally. A few years ago nearly all cases of hysteria or neurasthenia were treated for months and even years by means of pessaries, local applications, dilatation of the cervix, and curetting, and in an appalling number of such cases perfectly healthy ovaries were removed with the idea of relieving the nervous derangement from which the patient was suffering.

The late Dr. William Goodell showed his great wisdom when he declared that the pelvic organs were not nearly so often to blame as was commonly supposed, and he cried "halt" to the frequent operations which were being done without sufficient justification. The physician in charge of a case of mental or nervous disease generally has a constant struggle to keep up with the friends and relatives of his patient, who are eager for an examination or local treatment, or, it may be, operation. It seems to the laity,

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and, indeed, the same idea is found to prevail among some members of the profession, that there must be some local disease to cause any nervous disorder in a woman, and an operation, or possibly the correction of some uterine displacement, will be a short way to complete restoration of the patient's health. To some extent gynecologists have been to blame for this popular cry for operations on the pelvic organs. A few years ago specialists were far too ready to operate, and they did not always deem it necessary to find evidences of disease in the organs themselves before they were removed. Ovariotomies were done for the relief of epilepsy, insanity, hysteria, and even for idiocy. The number of operations done upon the pelvic organs has been enormous. A recent writer[1] quotes Dr. Cann as asserting that "in Paris, since 1883, 40,000 ovariotomies or hysterectomies have been performed, and estimates that there were 500,000 such operations done in all France during that time." Dr. Cann says, "of 102 operations done at St. Joseph's Hospital in Paris, all who escaped death are in a more deplorable condition than before operation, and that the nervous conditions were augmented in almost all." He thinks that "probably 4 per cent. derived some benefit to the nervous troubles from the operations."

The amount of literature bearing on the relations between nervous disorders and the diseases of the pelvic organs is very great, but the testimony adduced is most contradictory. As a rule, gynecologists favor operations, with, of course, exceptions, while neurologists oppose them. Gray believes that there is no proof that genital irritation in males or females can cause nervous or mental disease except in predisposed persons. Rohé, on the contrary, who has had a large asylum experience, believes that many cases of insanity in women depend upon pelvic disease and are cured or benefited by operations. Krämer has collected all the cases he could find of ovariotomies and other pelvic operations which were performed for the relief of neuroses and psychoses, and has gathered together from various sources 300 such cases. In 200 of these cases the operation had a beneficial effect; and in 100 it was doubtful or unfavorable. The author reports two cases of his own which were cured of hystero-epilepsy by operation, but he maintains that the same result could have been reached without mutilation, and this is probably true of the majority of the 200 favorable results which he reports. Charcot condemned all operations upon the pelvic organs in the treatment of hystero-epilepsy, mania, etc. He did not believe that such conditions as genital hysteria, genital epilepsy, or menstrual epilepsy existed. Other French writers, Gilles de la Tourette, for example, hold the same views as were held by Charcot.

There is no doubt that there have been a number of cases of nervous disorders which have been relieved by operations upon the uterus or ovaries, and it is no doubt true that some of these cases would not have

[1] Dr. C. W. Chancellor, Maryland Medical Journal, October 3, 1896.

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recovered had no operations been done; but we must bear in mind the effects of operations *per se*, and I would call attention to the valuable paper on this subject by one of our Fellows, Dr. J. William White.

Like Dr. Mitchell, I have seen several cases of melancholia recover speedily after some serious accident. A patient of mine attempted suicide by setting her clothing on fire. She was terribly burned, but almost immediately recovered her reason.

My own experience has been that comparatively few nervous or mental disorders depend upon uterine or ovarian disease, and that, unless there is a highly neurotic tendency in the individual, neither disorders in the pelvis nor in any other part of the body produce reflex nervous diseases.

Time will not permit me to give illustrative cases, but I have seen many patients, three or four years after the removal of the ovaries and appendages for the relief of some form of nerve-trouble, who were, if anything, worse than they had been previous to the operation. Many of these patients have been completely restored to health by other means, but it must be admitted that there are other cases which have not been benefited by any plan of treatment. I recall one case in particular in which Dr. Battey, the great advocate for the operation of oöphorectomy, had operated himself for hystero-epilepsy three years previously. The patient's condition was deplorable; the attacks of hystero-epilepsy were of frequent occurrence; her body was emaciated to the last degree, and her stomach tolerated almost no food. Under a course of "rest" treatment the patient recovered her health entirely and has remained well to the present day, a period of over six years.

Another patient, who had extreme neurasthenia, with severe attacks of abdominal pain and inability to walk, was seen two years after an operation for the removal of the ovaries, in the same condition as she had been previous to operation. She recovered under careful management, and has remained a comparatively well woman. I could also mention a number of cases that had been condemned to lose the ovaries and who recovered their health through other means.

If pelvic disease exists, it often aggravates all nervous symptoms, but in many instances the menstrual disorders and ovarian neuralgic pains seem to be rather the result than the cause of the existing nervous disease.

Dr. F. X. Dercum: The two great neuroses to which women are especially liable, neurasthenia and hysteria, have etiological factors so numerous and diverse that a brief study of the subject cannot but convince us that pelvic disease, if it can be considered a factor at all, can only be concerned in a small percentage of cases. In looking for a special cause for neurasthenia or hysteria such etiological factors as neuropathic heredity, improper education, the strains imposed upon women both during adolescence and during adult life—strains entirely independent of their sexual functions or

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of any possible pelvic disease—such, for instance, as overwork, the worries incidental to household duties, the care of children, the daily frictions of life, are too often overlooked. These general factors are far more potent as causes of the great neuroses than local disease, no matter how serious its nature. Local disease, it must be remembered, if it acts at all, can only act as an exciting cause upon an organism already gravely predisposed. How little local organic disease of itself acts as a factor in the causation of hysteria everyone of us will recognize when I cite but the single instance of cancer of the uterus in which neurasthenic and hysterical symptoms are notoriously absent. Is it not, indeed, significant that in such a grave pelvic disorder these symptoms are rare, and that in the majority of cases the hysteria and neurasthenia are referred to such trivial conditions as a tear of the cervix or laceration of the perineum, or, perhaps, an apocryphal ovarian tenderness?

If local organic disease acts even as an exciting factor we should certainly meet with nervous affections in grave forms of pelvic disorder most frequently and little or not at all in the minor pelvic troubles. It is hardly necessary to point out the unequivocal existence of neurasthenia and hysteria in the male, where by no possibility can these disorders be ascribed to pelvic disease. Again, experience demonstrates that surgical interference does not cure either neurasthenia or hysteria, and as far as pelvic or abdominal operations are concerned, especially ovariotomies, it is universally conceded by neurologists that the patients, instead of being made better, are made worse. Everyone of us has had under his care and observation cases in which the nervous conditions, which the operation was intended to relieve, were made indescribably more severe by the added symptoms of an enforced and premature menopause.

Admitting, however, for the sake of argument, that nervous disorders which owe their origin to pelvic disease really exist, these disorders would be separable into two groups: first, the general neuroses, neurasthenia, and hysteria; and, secondly, local nervous affections directly dependent upon the organic disease within the pelvis.

As regards neurasthenia, let me point out that it is separable into, first, neurasthenia simplex, and, secondly, neurasthenia symptomatica. The latter is not a true neurasthenia, but a spurious neurasthenia, and if pelvic disorders are concerned at all in the production of neurasthenia it must be this spurious or symptomatic form. It is conceivable that serious local diseases shall weaken the entire organism and with it the nervous system, and that various signs of nervous weakness should be present is but natural, but these signs do not make up that disease which we know typically as neurasthenia simplex. They are symptoms of nervous weakness, such as accompany *other* diseases, either local or general. They are seen, for instance, in phthisis, in chlorosis, and the various anæmias, in the toxæmias due to infection or metallic poisoning, and in other grave disturbances of

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nutrition, but we will all agree that they form in such cases a very subsidiary and very unimportant group of the symptom-complex. Strangely enough, as I have already pointed out, nervous symptoms are not present in really grave pelvic disease such as cancer, but pelvic lesions are only discovered in cases presenting nervous symptoms after careful search by skilled diagnosticians, and then consist of lesions, as a rule, inconsequential and unimportant.

To some extent of late years gynecologists seem to have recognized these facts, because minor gynecology, so-called, is happily almost abandoned. The amount of harm that the unnecessary handling and meddling with the genitalia has done can probably never be estimated. One can hardly judge of the enormous mental impression a first examination must make upon a young girl, especially if that girl is already hysterical and neurasthenic, already neuropathic by heredity and predisposition. Not only is the great evil of the moral shock to be taken into account, but the fact that there is lodged in the patient's mind a more or less vague but fixed belief that she has some mysterious local disease to which she only too willingly agrees to attribute her nervous manifestations. In consequence, she sooner or later insists upon a repetition of the examination or a continuance of the local treatment once begun, and the morbid idea thus implanted becomes hopelessly rooted, never, perhaps, to become displaced.

These words apply also to the harm done to adult women; to married women. The old practice of swabbing the cervix, of cauterization, or of pencilling with iodine or carbolic acid, and the more modern fad of introducing an electrode into the vagina—in short, the handling, the sounding, the passage of the speculum itself—have done nothing to cure the patients, but have superimposed upon the pre-existing neurasthenia and hysteria a train of morbid ideas which not infrequently grow into a veritable psychosis. Not only does the patient acquire the fixed belief that there is something serious and mysterious the matter with her, but she has added to this belief the dread of sterility, the dread of hopeless organic disease, or the fear that she has become unfit for marriage; or other equally depressing ideas make their appearance. Surely, if the pelvic organs really play a *rôle* in the etiology of neurasthenia and hysteria, it is largely because the gynecologists have created that *rôle*.

Among the symptoms presented by hysterical women there is one deserving of especial attention. It is one which, more than any other, suggests to physicians unacquainted with hysteria, pelvic disease. The symptom is that of the so-called ovarian tenderness, so misnamed by the French. This ovarian tenderness is, as a rule, only evident upon pressure, light or deep, applied just above the groin. In some cases, however, instead of there being merely tenderness, it amounts to a constant and severe pain, for which the patient anxiously seeks relief. The position of this symptom of ovarian tenderness in the syndrome of hysteria is so well known that it

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needs hardly to be mentioned. The pain is, as a rule, confined to a limited area, is found most frequently upon the left side, and is very often associated with a similar, though somewhat larger, area of tenderness beneath the left mammary gland, and, it need hardly be said, also, with other definite, well-marked hysterical stigmata, which it is not necessary to touch upon here. As a rule, the seat of this "ovarian pain," or *inguinal* pain, as it ought to be called, is revealed by careful examination to be superficial and not deep. That it is really situated in the skin and tissues of the abdominal wall and not within the pelvis, I believe can always be demonstrated by means of the following procedure: The painful area having been carefully localized on the abdominal surface, the tip of the forefinger of the right hand is allowed to rest lightly upon it; the left forefinger is then introduced into the vagina and directed upward and to the left until its tip is immediately beneath the tip of the forefinger of the right hand, which is upon the abdominal wall. Just as soon as pressure is made between the two fingers the patient flinches, while the patient does not flinch when pressure is made in other directions or when other portions of the abdominal wall are included. By this means I have succeeded not infrequently in isolating and demonstrating beyond a doubt the site, and therefore the character of the pain. In some cases, just as in spinal tenderness, the pain radiates and becomes somewhat diffused, but it always radiates from a superficial centre in the abdominal wall. Just as there are cases of spinal tenderness in which the tenderness is at one time superficial and at others deep, so there are cases of inguinal tenderness in which the tenderness seems at times to be deep-seated; but even here, by the procedure I have described, the maximum point of pain can always be isolated and shown to exist in the abdominal tissues.

This hysterical inguinal pain has at times forcibly suggested to me the clavus hystericus—the boring, penetrating pain which hysterical patients feel in limited areas about the head—and, indeed, in rare cases this inguinal pain is just as severe and just as agonizing, but is no more intrapelvic in its origin than is the clavus of the head. If any doubt with regard to the nature of the pain were to exist in our minds, it would be instantly dispelled when we realize the fact that we very frequently meet with it among men, and, secondly, also in women whose ovaries have been removed—removed, indeed, in a vain attempt to relieve this pain.

Hysteria and neurasthenia are great neuroses, with little or no relation to local conditions. They are diseases general in character, aggravated, it may be, now and then by special local lesions, but certainly not caused by them. The origin of these diseases is to be sought for in the ancestry, in the bringing up of the child, in its training, in its education, in the struggles and in the trials of life, not in a laceration of the cervix, a cyst of the ovary, or a tear in the perineum.

If gynecologists retreat from the position that the great neuroses are

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caused by pelvic disease, but maintain, on the other hand, that local nervous disorders are caused by them, I will ask, first, What are these local disorders? It is said, for instance, that lumbar and sacral neuralgia, pain in the sciatic distribution, are caused by pelvic disease. If so, it has not been my fortune to meet with cases. I do not, of course, deny the possibility of their occurrence, but certainly lumbar or sacral neuritis and neuralgia due to such causes must be excessively rare. As regards other nervous symptoms, such as vague pelvic pains, pains referred to the back, the hips, or thighs, they certainly cannot be dignified by the term nervous disorder, but must be looked upon merely as symptoms of pelvic disease itself, just as there are various other surface areas of the body to which the pain of deep-seated organs is referred.

The mere fact that in mental diseases temporary improvement has now and then followed operations is no argument in favor of the application of surgical procedures in the treatment of insanities. I can supplement Dr. Mitchell's remarks concerning the improvement now and then seen in melancholia after trauma by calling to mind similar instances following trauma occurring in so grave a mental disease as paresis. Indeed, in paresis marked remissions are sometimes brought about by accidents, burns, or acute inflammatory troubles, such as erysipelas.

In my opinion operations upon the pelvic organs should be limited to actual diseases, such as pyosalpinx and malignant affections. In such cases the operation should be performed not for the relief of an incidental nervous symptom, but because of the local conditions themselves; just as we set a broken leg, not because the fracture occurs in an insane man, but because the leg is broken.

DR. JAMES HENDRIE LLOYD: Modern science has almost entirely abolished the idea that hysteria has its seat in the uterus; but, in spite of this, it seems that this idea still obtains to a certain extent in the minds of some gynecological surgeons. I do not quite agree with Dr. Mills, however, that hysteria can never be caused by pelvic disease. I think there is a difference between viewing hysteria as having its seat in the uterus and as having its exciting cause in the uterus. Hysteria is a psycho-neurosis, but it can be excited by numerous diseases which act as exciting causes. It is conceivable that it might be started by a diseased ovary, an ovarian tumor, extensive cervical lesion or lesions of the floor of the pelvis; and in these cases operative interference might favorably affect the hysterical manifestations. Still, such complications, in my observation, are rare, and do not justify the opinion that grave hysteria has always, as an exciting cause, some obscure pathological state of the womb or ovaries. It must be recalled that the operation of castration in the female is sometimes followed by grave hysterical troubles, in such a case the very operation designed for relief becoming in turn an exciting cause of still more profound trouble. I have

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had under my observation for the last three months a young woman who is a typical case of hysteria. She is paralyzed from the hips down, and she has various other symptoms of a hysterical type. Her mind is completely perverted.

She has been operated on four times, all the operations being grave gynecological operations, two of them being laparotomies. I do not know how many of her pelvic organs have been removed, but I know that these operations have succeeded in putting her into bed as a practically hopeless invalid. Such a case should stimulate gynecologists to attempt to make some use of suggestive therapeutics, and not to teach patients to rely entirely upon the knife. I recently had another case illustrative of another type of disease. The patient became a confirmed hypochondriac upon the subject of the health of her pelvic organs. She had been under my observation for several years, and her talk was almost constantly of her ovaries and womb. She could not talk to a physician without getting upon the subject, and would talk about it for an hour at a time. She went into the hands of a prominent gynecologist, who wisely refused to operate; but she was not so fortunate in the hands of another surgeon, who operated upon her with the result that she died on the third day. This was a clear case of a useless sacrifice of life. The patient had no condition of her pelvic organs which, in my opinion, justified such a serious operation. I do not see how, under such circumstances, an operation of a grave character can be justified for what is practically nothing in the world but a hypochondria, dependent just as much on brain-disorder as insanity is dependent upon brain-disorder.

Another aspect of the case is the fact that some serious nervous conditions may rise in cases of real pelvic disease. Thus a patient may undergo a perfectly proper operation, and may develop insanity as a result of it. I saw a lady several years ago suffering from melancholia, the result of hysterectomy. I believe that the hysterectomy, although justifiable, acted as the exciting cause upon a woman already neurotic. She had peculiar obsessions and believed that she had done wrong in submitting to the operation. The mere fact that this operation had been successful might lead others into it, in her opinion, and this weighed upon her morbid sense of responsibility to the extent of causing a pronounced melancholia, so that it was necessary to send her to a hospital for the insane. Another type, and an important one, is the so-called confusional insanity. This may follow grave gynecological operations, just as it may the puerperium. Kraft-Ebing is disposed to attribute these insanities to the effect of the chloroform, ether, iodoform, and other substances used by surgeons; but I do not know that he is correct. The fact is, however, that these insanities occurring after operations, just the same as the form occurring after childbirth, are probably due to some form of infection of the blood. There is some septic condition which is the primary disturbing cause in these cases to produce this insanity. The importance of this class of insanities is that they usually occur in the most

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unexpected cases, and cases which are operated upon under favorable circumstances occasionally develop this grave disease.

DR. JAMES TYSON: Being requested to speak on the subject under discussion from the standpoint of general medicine, I infer that it is expected I shall consider the consequential effect of pelvic disease on disease of different organs through the nervous system. It seemed to me that there was but one way in which I could do this with any expectation of adding to the discussion, viz., by reporting briefly one or more cases bearing on it. It so happens that three such cases have recently been under my care, in all of which, however, the reflex symptoms bore on one set of organs only—the digestive.

The first case was a handsome married woman, aged thirty-seven years, who consulted me in midsummer for severe headache associated with gastric symptoms, including nausea and even vomiting, with epigastric distress, flatulent distention, and constipation. These symptoms had existed for some time. Before seeing me she consulted an accomplished gynecologist, who discovered a double pyosalpinx. Early in July both ovaries and Fallopian tubes were removed. She made a good recovery after the operation, but her dyspeptic symptoms remained altogether unrelieved. It was on this account that she consulted me. While the operation was amply justified by other causes and was done on account of them, it was fondly hoped that it would also remove the symptoms described. The hopes were unfounded, and she continued to suffer just as before. The case proved to be an obstinate one, but yielded after a time to remedies which depleted the upper alimentary canal and liver. Among these, morning doses of Carlsbad salt in hot water were conspicuous. She was not, however, thoroughly cured when I last saw her, some time since.

Another patient was a woman, aged thirty-four years, married at the age of twenty years. During the first five years of her married life she bore three children at full term and had one miscarriage. In the birth of her first child she was badly lacerated. For ten years she has suffered from indigestion. Her appetite was capricious, sometimes enormous, at others she had none at all. At other times she craved certain kinds of food. She had acid eructations and suffered from flatulence. She had dull, aching pain some hours after a meal, when her stomach was empty. It was not relieved, rather aggravated, by taking food. She was relieved, on the other hand, by vomiting. The pain, beginning in the epigastrium, passed up the left side of the chest and sometimes to the back between the scapulæ. She has been subject, of late years, to what she calls "nervous spells." They occur under any circumstances; it may be in church or in the street; also at times as an apparent consequence of prolonged fasting, practised because of the discomfort occasioned by taking food, which she puts off on this account as long as possible. They are characterized by faintness and pallor,

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but she does not lose consciousness. In January, 1896, she began to use the stomach-tube, and, obtaining great relief thereby, has practised its use ever since.

In October she was admitted to Dr. Charles B. Penrose's ward on account of the pelvic disease, and on the 20th the cervix was amputated. After recovery from the operation she was transferred to the medical ward for treatment of the dyspeptic symptoms. An examination after a test-meal discovered a deficiency of hydrochloric acid, so that the acidity from which she suffered was probably due to organic acids. There was no dilatation of the stomach.

A third case bearing on this subject was that of a young married woman, aged twenty-seven years, who has never had children. When fifteen years old she had a first attack of rheumatism, and had another each year for three years in succession. She suffered from what she called ovarian trouble since she was sixteen years old, for which she was treated at the Woman's Hospital six years ago—that is, when twenty-two years of age. She also suffered from an annual attack of malaria for several years, having had the last about five years ago. For three years previous to admission to the University Hospital, in December, 1896, she suffered from dyspepsia, but since May the symptoms have been much worse. They include severe and almost constant pain, which begins in the epigastrium, near the left costal border, and extends thence upward toward the left breast and around under the angle of the left scapula, probably due to flatulence. Up to a month ago there was frequent regurgitation of food immediately after eating. Her appetite is poor, and she is inclined to constipation. A peculiar symptom is a "nervous catch," consisting in a sudden contraction of the muscles of the lower thorax and abdomen, more frequent when she is excited.

On December 4, 1896, Professor Penrose removed both ovaries and did the operation of ventrofixation of the uterus. She made a good recovery after this operation; but the dyspeptic symptoms continuing, she was transferred to the medical wards. She was thoroughly examined, the hæmoglobin measured, and blood-corpuscles counted; the former being found 60 per cent., and the latter 3,750,000. Both were, therefore, slightly lowered. Analysis of the gastric contents after a test-meal showed slightly reduced hydrochloric acid, but digestion was completed within the normal limit. There was no dilatation of the stomach. All of the old symptoms continued, and after a trial of a great variety of forms of treatment she was discharged in much the same condition as that in which she was admitted.

Thus there came under my care three cases in comparatively rapid succession in which marked digestive symptoms were associated with pelvic disease, which might reasonably be held responsible for them. Yet a thorough cure of the pelvic disease failed to relieve the digestive symptoms. I would not have it thought that because I adduce these cases I deny all

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causal relation between pelvic disease and disease elsewhere, a relation commonly characterized as reflex. On the other hand, I believe such relation exists. Yet they show clearly that the two conditions may exist independently of each other.

From such cases as those reported, however, we learn, first, that, given the association of pelvic disease and disease elsewhere, too much must not be promised in the way of relief to the latter as likely to follow operative or other cure of the pelvic disease.

Second, we are not justified in recommending operative treatment for pelvic disease only. My cases show that such expectations may be sadly disappointed. *In none of the cases reported was the operation done for the dyspeptic symptoms. It was justified by the pelvic disease itself, and done on account of it.*

Third, that the seeming reflex affection should be thoroughly studied independently of the pelvic disease which is suspected to be responsible for it. Thus, in the case of the stomach a careful study should be made of its physical state, of the quantity of its secretion, and the physiological activity of the latter, and of the motor and absorbing capability of the organ. Often, doubtless, in shortcomings of these will be found an explanation of the symptoms which may be corrected by their removal.

DR. ARTHUR V. MEIGS: All that I might have said has already been so much better said than it would be possible for me to say it that I shall not take the risk of repeating. I merely wish to add my testimony to what is the prevailing sentiment, as it has been expressed by the Fellows who have spoken, that more nervous disorders have been attributed to pelvic disease than can really be shown to be due to that cause, and that many operations have been performed in the past that had better been left undone.

DR. JAMES M. ANDERS: I regret that I did not hear the discussion from the beginning, but I infer from what Dr. Meigs has just said that the weight of opinion of those who have spoken was against the notion that nervous disorders are frequently dependent upon pelvic disease. The question under discussion presents aspects that are but little less interesting to the general practitioner than to the neurologist or the gynecologist.

Obviously, the general practitioner's view of the subject is more limited than that of the specialist; but, on the other hand, the latter, in order to understand all the reflex symptoms due to pelvic disease, must encroach upon the domain of general medicine. To discriminate the symptoms due to pelvic disease and presented by the lungs, heart, and stomach from symptoms quite similar in character but due to causes residing outside the pelvis, several points must be established. In the first place, one must determine whether the particular organ presenting the symptoms does not show some

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pathological change. If it does not, the general practitioner should, before ascribing the phenomena to pelvic lesions, look elsewhere for the immediate exciting cause. Take the heart as an example. The subjective symptoms of all forms of functional and organic disease of this organ may be counterfeited by reflex symptoms occasioned by irritation in the uterus and its adnexa. By a careful physical examination, however, we are able to determine the presence or absence of structural disease. If the case be found to be functional in nature, we should think of the possibility of its origin being in the pelvis; but the general practitioner should, before so deciding, eliminate every other known cause. The important fact has been brought out by the report of one of Dr. Tyson's cases that removal of the original pelvic cause often fails to cure a reflex neurosis. This fact makes many of the cases particularly puzzling.

The cardiac disturbances most commonly met with are palpitation, arhythmia, and pseudo-angina pectoris. A rare condition is tachycardia, and I recall a case which developed about one year before the menopause. The attacks occurred regularly with the menses, but since menstruation ceased they have recurred at irregular and much longer intervals.

The lungs are sometimes the seat of reflex disturbances, and the most familiar example is asthma. There is a small class of cases which presents the subjective features of an intense bronchial irritation, occurring either from time to time or undergoing marked aggravations and ameliorations. A dry, harsh, and very troublesome cough is present, which seems often to be dependent upon the congestion attendant upon menstruation. The patient thinks that the exacerbations are due to catching cold, but close observation shows that they are closely connected with the uterine congestion. The physical signs are absolutely negative. Hysteria may or may not be associated. It is important that this class of cases be recognized, since, as I have learned from personal experience, remedies directed to the bronchial mucosa are not curative, but are often followed by temporary relief only. Whether all of these patients would be cured by attention to the pelvic condition is doubtful.

The stomach is sometimes the seat of hystero-neuroses of reflex uterine origin, and the symptoms that I have observed most frequently are more or less gaseous distention of the stomach and intestine, nausea, and vomiting. In some of the instances cardiac palpitation is associated; in others cramp-like abdominal pains. We have a very small class of cases in which the subjective symptoms and physical signs are identical with those of chronic dyspepsia. But if we analyze the gastric contents, as I have done in two cases, we shall find them normal. Neither does the fasting stomach contain anything abnormal. Symptoms pointing to pelvic lesion are usually present, but may be trivial indeed. The question of the relation of pelvic disease to nervous disorders has another side—a fact which has been decisively emphasized to-night. Pelvic disorders, both functional and

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organic, may be secondary to strong emotional disturbance, including the nervous shocks occasioned by intense grief, violent passion, great joy, and the like. Analogous disorders of function and of nutrition in other organs of the body are constantly being witnessed by the general practitioner. This side of the subject is quite as important as the one to which I first invited attention and dwelt upon, but to discuss it fully would lead me too far.

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CONCERNING THE BLUE-LINE IN THE GUMS IN LEAD-POISONING.

By D. D. STEWART, M.D.

[Read March 3, 1897.]

If an apology is necessary for addressing the College upon a subject about which I have little that is novel to offer, it is that a knowledge of it must be considered of perennial importance.

Some few remarks that were made relative to the diagnostic value of the line in the discussion of the paper of our distinguished President, two months ago, indicated a lack of exact knowledge as to what constitutes the so-called *line* and its mode of causation. This is, perhaps, pardonable in view of the fact that attention has been given to the subject by but few systematic writers on medicine, and but a small number come sufficiently into contact with cases of recognized lead-poisoning to regard it essential to be well-informed on the subject. And yet, in view of the further fact that lead is one of the widest-spread and the most ubiquitous of poisons, causing most protean manifestations, it behooves all to be acquainted even with the minutiæ of the most common sign of systemic absorption.

Perhaps in this relation, and bearing directly on the importance of the subject, I may be permitted to refer to an extraordinary epidemic of lead-poisoning which I was the instrument of unearthing, occurring in this city and brought to the attention of the authorities in the early part of the summer of 1887. This wholesale poisoning, the duration of the existence of which it was impossible to ascertain, occurred through, as was subsequently developed at the coroner's inquest, at least 80 per cent. of the

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bakers and confectioners in this city at that time regularly using chrome-yellow as a color-adulterant. It was shown on the best authority that this dye had been in constant use by these bakers for many years. Lead-poisoning of severe type had doubtless been occurring in widely diverse sections of the city for a long time, and these cases, save perhaps in rare instances, had all along escaped recognition, simply because of the possibility of it, through absence of apparent source, not being taken into account in arriving at a diagnosis in a case with somewhat obscure symptoms, the blue-line not being searched for.

What first led to the recognition of these cases of wholesale poisoning, the result in many of which was so terrible, is now a matter of history. It need not be entered into in detail here. Suffice it to state that with symptoms totally unsuggestive of lead-poisoning as commonly seen, with total absence of colic, wrist-drop, and the like, but with the occurrence of pronounced cerebral symptoms, the so-called encephalopathy saturnina, in a family, several of which at the time either had pertussis or were convalescent from it, it was the search for a blue-line in the gums that led to a solution of the mystery. After all sources for the convulsive seizures had been considered in vain, finally, by exclusion, I thought of lead and searched for the blue-line. It was the discovery of this, which, although not decided, was undoubted, in the second of the fatal cases that I had seen in the Diebel family, that decided the question and led to a search for the source of the poisoning. In pursuit of this it was the discovery of the most intense line in the gums of the family's baker and his wife, and the eliciting from these of a history of several deaths from convulsions of undiscovered source that had occurred some years before in their own family, that determined me upon a search of their cellar for chrome-yellow. This incident is merely noted in passing as bearing on the importance of a knowledge of the character and diagnostic significance of the blue-line in the gums and the necessity of a search for it in cases of obscure illness, the nature of which is in doubt. Instances might be related of lead-poisoning with obscure symptoms and source, the last other than the adulteration of cakes, which I have subsequently encountered and in which the presence of a

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blue-line has assisted most materially in throwing light on the diagnosis. Some of you have undoubtedly encountered similar cases.[1]

It was from the examination of these cases of chrome-yellow poisoning, nearly 100 of which I have collected, that I obtained the chief data for this paper, studying the line in its various stages and over a long period. Since that time, now nearly ten years ago, I have seen a great many cases of lead-poisoning, so that I may be regarded as able to speak with some authority on the nature of this diagnostic sign in question.

Henry Burton, in his memoir on "A Remarkable Effect upon the Human Gums Produced by the Absorption of Lead,"[2] is generally regarded as the first to have pointed out the occurrence of the blue-line as an indication of the systemic absorption of lead. In this communication he gives a detailed account of such phenomena as he had studied relative thereto from the time his attention was first directed to the line occurring in the case of a patient in the wards of St. Thomas's Hospital, in 1834. But Tanquerel, in all probability, before this date had noted and studied the line, his wonderfully painstaking investigation into lead-diseases, which culminated in the appearance of his classic work on this subject in 1838, having been begun in 1831. In this Tanquerel has given a quite thorough description of the gingival discoloration as occurring in its most pronounced type. The cases in which the line was noted by Tanquerel were all in those poisoned by occupation and commonly displaying aggravated symptoms of plumbism. Under the caption "Leaden Discoloration of the Teeth and Mucous Membrane of the Mouth," Tanquerel noted with great accuracy the limitation of the bluish or slate-gray discoloration through an extent of a few lines in depth on the gingival margin, and remarked that the remainder of the gum often presents a light bluish-red color; that in extreme instances the slate-color may tint the whole extent of the gum. In these, by prolonged contact with decomposing food-elements or even viscid saliva, a more diffuse, general discoloration of the mucous membrane was inevitable. Tanquerel remarks on a similar, now commonly observed, discol-

[1] These are common enough in medicine, although detailed chiefly in memoirs.
[2] Medico-Chirurgical Transactions, 1840, vol. xxiii.

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oration of the exposed fangs and body of the teeth in those with unclean mouths. He refers to the peculiar nutritional changes occurring in the gum-margin under the influence of the prolonged action of lead; its shrinkage, with subsequent disappearance of the affected interdental processes of the gum, and atrophy and denudation of the portions surrounding the fang. He remarked on the deposits of lead being commonly more decided in the gum of the lower than of the upper jaw, and that it sometimes occurs that only the margin of two or three teeth become blue and are subsequently absorbed. In a few cases observed he noted also that the dyed gum-margin was so congested that bleeding occurred on slight irritation.

Tanquerel ascertained that the discoloration of the gums and of the teeth was, chemically, lead sulphide. He pointed out that the sulphur, as is now accepted, is probably derived from the decomposition of albuminous food-particles and not from the sulpho-cyanogen of the saliva. H_2S formed from these, he thought, came into contact with lead-particles in the mouth, and, depositing on the gum, originated the discoloration. He therefore thought the blue-line, as it is usually seen, a local sign; but since he also speaks of congestion and subsequent atrophy of the gum, with dental caries, resulting from obstruction of the capillary vessels of the gum by the lead sulphide, he doubtless, although he does not specifically so state, also regarded the lead-line as at least occasionally also intra-gingival.

Tanquerel remarks, in concluding, that this lead discoloration of the gums affords an excellent means of discovering whether an individual has inhaled or swallowed lead-particles.

As previously stated, Burton is commonly credited with first noting and describing the pigmentation of the gums occurring as the result of the deposit therein of lead sulphide. Although, as I have said, this is unlikely, he at all events may be claimed to have remarked this sign at least coincidentally with Tanquerel, and while unaware of the latter's investigations. Burton's observations on the blue-line were largely confined to cases, usually of phthisis, in which the line was the result of lead absorption from its medicinal administration. At that time lead acetate was freely employed internally as an astringent, especially in hæmoptysis, and

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it was evidently not uncommon to obtain by its use some indication of slight poisoning other than the blue-line, the occurrence of the last of which, as remarked by Burton, was merely a sign of the systemic presence of the metal; as such Burton regarded it of the greatest diagnostic value. His experience warranted him in viewing it as a very common occurrence in those who, by accident or design, had absorbed lead. He remarked that this sign preceded all other unequivocal symptoms—a sign even more distinct in death than in life.[1] If Burton may not be credited as the first to note the blue-line and its significance, he, far more than Tanquerel, deserves praise for specifically pointing out its immense diagnostic importance, standing, as it does, as the indication of the systemic absorption of lead. Burton urged the necessity for a search for the line in cases the character of the symptoms of which render the nature of the ailment in doubt, remarking that its appearance, even though exposed to the metal and yet symptomless, should be taken as a friendly warning as the probable approach of serious effects of lead on the nervous system.

Besides the observations of Tanquerel and Burton on the subject, the only other recorded especially worthy of note is that by Hilton Fagge. In a contribution to the Medico-Chirurgical Society[2] and in his posthumous work, which contained data of the highest value relative to certain peculiarities of the so-styled line, he especially pointed out that the term *blue-line* is in many instances a misnomer. He called attention to the fact that the line which is really characteristic at first is not continuous, but consists of merely a single row of *black* dots or a series of the same corresponding with vascular papillæ in the normal mucous membrane. This observation was originally made by Sir William Gull, to whom Fagge credits his indebtedness. Gull had remarked that the same papillæ, which correspond to minute vessels arranged side by side, may often be noted as fine, reddish points in the gums of healthy subjects. By removing with fine scissors, as I have since

[1] This observation of Burton, that this lead discoloration of the gum is commonly more pronounced after death, I have verified in several fatal cases observed by me. The distinctly blue gingival margin was in far sharper contrast with the pallid gum than had been evident in life.

[2] Medico-Chirurgical Transactions, 1876, vol. lix.

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myself repeatedly done, the edge of the gums in which this lead-pigmentation was evident, and examining under a low power, he demonstrated that the discoloration was not uniform, but was distributed in the form of rounded loops, some of which have the appearance of papillary processes of the mucous membrane, but many of which are actual small vessels the walls of which are marked out by the lead deposited in their lumen. Fagge remarks that Gull had observed that the line, in its earlier development, is usually imperfect, there being only two or three dots here and there, and these, perhaps, only noticeable in the processes of gum which project between certain of the teeth. He noticed how, with exaggeration of the discoloration, the dots cease to be apparent, and a deep, homogeneous staining of the mucous membrane, several lines in depth, takes their place. He stated that the blue color of the line is in reality only apparent, as examination with the lens will reveal. These dots will then be seen to be in reality black. These observations of Gull and Fagge, which I have abundantly verified, indicate beyond question that this form of blue-line at least cannot be viewed other than as a demonstration of deposit of the metal from within. Fagge also pointed out that in several cases he had noted that the employment of potassium iodide in subjects of lead-poisoning caused a not inconsiderable increase in a faint line already existing, and brought about the development of one not before apparent. The exact explanation of this interesting phenomenon, also remarked simultaneously by Dr. Smith, of Sheffield, and later by myself (as concerns intensification of the pigmentation under the use of potassium iodide) I regard as follows: While lead-salts are but poorly soluble, and as chlorides or bicarbonate can be contained only to a limited extent in the blood, the double iodide of lead and potash is much more readily so. As a result, under the influence of potassium iodide lead deposit in the tissues is readily taken up and its solubility maintained; hence a much greater quantity may appear in the blood, and, passing through the vessels of the gums, be readliy precipitated in the latter. Doubtless the tendency shown by the gingival margin toward eliminating iodine is also a considerable factor in the production of increased pigmentation under the influence of potassium iodide.

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Nearly all the French observers writing on lead-pigmentation of the gum, such as Fleury, Grisolle, Valleix, Constantine Paul, and A. Grubler,[1] have curiously held to its being but an occupation-sign —*i.e.*, of the entrance of lead into the gum directly from the mouth. These authorities had come in contact only with very pronounced cases of plumbism in subjects in whom the presence of lead in the mouth from their work was common. It seemed easy for these observers to believe that lead could be readily deposited in the gums because of its more or less constant presence in the mouth. They were either unaware or took no note of cases in which a blue-line was common from the use of drinking water containing such infinitesimal traces of lead that for it to be deposited on the gum in process of drinking is out of the question.

Oliver, who has furnished us a most instructive work on lead-poisoning,[2] but whose immediate observations on lead cases have been confined almost solely to those of pronounced type among lead-workers, is also inclined to favor the view that the blue-line is due to the deposit of lead from without. He has never noticed the very delicate and highly important slight pigmentation described by Fagge, of which I have seen more than a score of instances, and remarks on only the deeper line, such as is encountered in lead-workers.

Oliver believes that there is absorption of lead from the mucous surface either by the lymphatics or the cells themselves, and yet, curiously, he speaks of a case in which a blue-line developed a day after a single large dose of lead acetate had been taken, and he probably is aware of the cases cited by Burton, in which, after the ingestion of but fifteen grains of this salt, the blue-line developed four days later; and of another case (Peasey's), in which it developed in seven days after twenty-one grains; and of Moyle's case,

[1] Grubler (article on the "Semiology of the Mouth": Dechambre's Dictionnaire Encyclopédique des Sciences Médicales), who has had no practical experience with lead cases, attempts to explain the origin of the line from without by remarking that perhaps its occurrence is analogous to a phenomenon which has been observed in natural history, the taking up of a spicule of grass by a rapidly growing mushroom, the fungus tissue of which divides to enfold it. Although this may explain the chance entrance of lead into the epithelial cells of the gums through prolonged contact, it cannot, of course, explain its primary precipitation in the vessels of the gum in the earlier period of pigmentation before the lead sulphide has been extruded from their walls into the adjacent intervascular tissue.

[2] The Gulstonian Lectures, 1891.

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in which the discoloration was produced in twenty-four hours by four doses of five grains each. It is presumed that lead so administered, given for medicinal purposes, was not allowed to remain long in the mouth.

Dr. Oliver, in citing his views as to the mode of origin of the blue-line, evidently neglected to note the significance of a case cited on another page of his book—that of a gentleman with pronounced symptoms of plumbism, such as cachexia, colic, and, later, paralysis and cerebral manifestations, in whom there was at first a slight blue-line, which subsequently, coincident with the appearance of aggravation of symptoms, gradually deepened. His wife had also a blue-line. The source of lead was the drinking water, which contained the metal only to the extent of 0.0028 *grains* to the gallon. It is common for those who have had much to do with lead-poisoning to have observed the presence of a blue-line in cases due to the presence of quite as minute traces of lead as this in drinking-water. I have seen a number of instances of such, and Putnam, of Boston, among others, has encountered a very large number. These facts, with others cited, seem to establish unquestionably that lead in the gums is a deposit from the blood.

For the correct understanding of the presence of the blue-line in the gums, a few words must be said concerning the gross and intimate structure of the peridental membrane. This structure, which is the organ of touch of the tooth, surrounds its root, uniting it with its alveolus. Concerning this membrane, Mr. Salter (*Dental Pathology and Surgery*) remarks: "In structure it consists of an elastic layer of fibrous tissue, intimately connected and continuous with the periosteum of the jaw; upon this is placed a regularly and strongly marked papillary structure, covered in by a dense epithelium. The papillæ are long and cylindrical near the edge of the gum, like the fingers of a glove, and they become shorter and expand in passing toward the jaw and palate; each papilla contains a single capillary loop."

The peridental membrane is on all sides intimately connected with the tooth and periosteum of the walls of the alveolus by bundles of fibrous tissues, styled the dental ligament. Normally this attachment to the tooth extends to from one-eighth to three-

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eighths of an inch from the extreme edge of the margin of the gum, varying, as Black remarks,[1] in different persons and in the same teeth and in the same person. This unattached margin of the gum is termed the gingival margin, and by some the gingival organ. It seems to possess a gland-like structure, though of the simplest kind. It consists of a surface which, clothed with small, round epithelial cells, is cupped and folded between ramifications of a rich capillary network. This emits a profusion of globular cells, termed mucous corpuscles. These mucous corpuscles, often as inspissated masses, and not infrequently mingled with colonies of micro-organisms and particles of food, are always found in this situation, beneath the free, thin edge of the gum. It is this portion of the gum that is concerned in the excretion from the blood of certain poisons, such as mercury, iodine,[2] copper, and, in all probability, lead. These, and especially mercury and potassium iodide, tend in process of excretion to readily produce irritation and subsequently inflammation of this free margin of the gum.

However lead enters the system, after absorption it must exist as a soluble salt in the blood, which latter, in all probability, when the mode of entrance is through the stomach, is lead chloride. As lead chloride, and perhaps also as other soluble salts, the nature of which is undetermined, it circulates in the blood, but in very small quantity, however freely it may have been ingested, since even the most soluble salt that can gain entrance into the vascular system tends readily to be precipitated in the tissues after osmosis from the vessels with the plasma. Solubility of the lead-salts in the blood seems to be maintained through the influence of the contained chlorides. At the best, such salts can exist only in the smallest quantity, and the removal of but a small part of their solvent must lead to their prompt precipitation in whatever part of the economy they may be.

The poorly soluble and easily decomposible salts of lead, in process of circulation through the capillaries of the gums, are

[1] This description is largely from that given by G. J. Black : American System of Dentistry, vol. i.

[2] Cells taken from the gingival border in cases in which potassium iodide is being administered have been found by Salter to give the iodine reaction.

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easily acted upon by even minute traces of liberated sulphur from decomposing food detritus, which may exist but in the smallest amount in order to furnish the necessary element for separation of the lead-salts and its precipitation as lead sulphide. It has been seen that normally for the extent of from one-eighth to three-eighths inches the gum about the neck of the teeth is unattached, and that the inner portion of this edge may be regarded somewhat in the nature of an excretory organ. It is easy to understand that with a slight excess of mucous corpuscles in this situation, as a result of the irritant action of small quantities of lead which must be in process of excretion here, there is a tendency to separation of the gingivæ, if such separation does not already exist. Even in those who pay the closest attention to mouth-hygiene, this favors the accumulation of food-particles about the neck of the teeth. Concerning the question of mouth cleansing in a manner that obviates tooth-decay, it must be said that as practised by even the great number of those who are regarded as most fastidious in this particular it is commonly but poorly done. The mere use of the tooth-brush twice daily, if unaccompanied by thorough rinsing of the buccal cavity after food, and, when there is a tendency of food-particles to lodge in the interstices of the teeth, also the employment of the silk thread, inevitably leaves a certain amount of detritus about the neck of the teeth adjacent to the dental margin. Concerning the truth of this, a careful investigation has convinced me. It is the decomposition of these food-particles, however infinitesimal in amount they may be, which occurs readily about the canines, bicuspids, and molars, especially in the lower jaw, that yields the traces of hydrogen sulphide necessary to readily precipitate the lead circulating in the capillaries in the edge of the gum. In this manner pigmentation of the gingival margin adjacent to one or several teeth occurs. The pigmentations will necessarily be slight in those of cleanly habits and perhaps only be discoverable as a few scattered black dots in the thin margin of gum about one or two teeth. But even in these, should systematic saturation be pronounced, continued precipitation in the gum will occur, and afterward a well-marked line will appear. In those habitually inattentive to the mouth, though no more lead has been absorbed, the pigmentation

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will be far more decided from the first. It is the failure to recognize these slighter but most significant (from a diagnostic standpoint) degrees of pigmentation, in a search for an actual broad line, that has frequently led many otherwise acute observers to overlook the undoubted presence of what technically may be termed *a line*. I regard the failure to note this slight pigmentation as very frequent, even among those who have had some experience in lead-poisoning occurring in lead workers; and thus, I am sure, cases are not infrequently cited in which it is stated a blue-line was totally absent and yet pronounced lead-poisoning was present. I have so frequently encountered cases in which these small pigmentations, due to the deposit of lead sulphide in the edge of the gum, were not remarked by others who had made, at my suggestion, a search for a line, that I have for a long time placed little value on the negative observations of those whose attention has not been especially directed to this phase of the subject.

In the very large number of chrome-yellow poisoning cases, most of which I had steadily under observation for several years, and in a considerable number of hospital cases subsequently seen, I have had abundant opportunities to study the line. What made certain of these cases of special interest was the fact that many of them were of cleanly habit, and had, when they came under observation, well preserved teeth and gums.

All of the chrome-yellow cases I personally observed displayed a blue-line. In at least seventeen of these it was noted that the line consisted of but a very narrow bluish-black streak or a series of dots limited to the thin edge of the mucous membrane of the gum grasping the neck of but one or two teeth. These dots, or the black streaks which represented but an aggregation of them, were most frequently confined to a portion of gum grasping but a single tooth, often one of the bicuspids or anterior molars. Several of these cases, including two of the Diebel family, exhibited, besides cachexia, only the cerebral manifestations of lead-poisoning; colic, and other more common symptoms being totally absent; so that, if not on the watch for this phase of the line, the diagnosis might have been in doubt had not the history of the ingestion of lead, the discovery of this metal in the urine, with

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cessation of symptoms on appropriate treatment, established the diagnosis.

The history of one of these cases, previously published,[1] may be cited here to show the importance of the search for this phase of the line:

Mrs. V. G., aged twenty-two years, no children; had been for months a hearty eater of Palmer's dyed buns; in excellent health up to three and a half months ago, then began to grow progressively weak; was easily wearied, the slightest exertion causing great fatigue; she suffered with insomnia, was depressed mentally, and there were constantly present such disorders of the digestive apparatus as coated tongue, foul breath, bad taste, frequent nausea, with occasional vomiting, especially after food, mild constipation, and occasional slight, colicky pains in the left lumbar and inguinal regions. There were also total anorexia and earthy-yellow hue of skin, and severe, constant, dull, aching pains in the knees, with a feeling of soreness in the feet. Violent occipital and frontal headache appeared shortly after she began to fail in health, and soon became constant, with remissions and agonized exacerbations often associated with transient amblyopia. About the same time she was affected with subjective and objective vertigo, the slightest exertion causing giddiness. Since the headache and vertigo have been present she has frequent hallucinations and delusions of sight and hearing; among others, she would imagine she was approached by persons who did not exist, with whom she would carry on lengthy conversations. During and following these spells she becomes exceedingly despondent and has dismal forebodings. . . . She complains of slight ataxia of the forearms, though the muscles respond normally to faradism and galvanism. The heart is overacting, with an accentuated second sound at the apex and high tension in the pulse at the wrist. Various specimens of her urine were carefully examined for albumin at different times, but always with a negative result.[2] As her sight had recently failed somewhat, the eyeground was examined by Dr. Hansell, who reported that "in the right eye the nerve is oval; the upper and outer quadrant is lined with pigment; the lower part is clear and sharply bounded. There is venous pulsation; the arteries are slightly swollen, more so than normal. The above conditions are even more pronounced in the left eye." The gums of this case did not show what is ordinarily regarded as a "blue-line," but within the thin margin of gum grasping the neck of the upper left central incisor could be seen, by careful inspection with the naked eye and more easily with a single lens of moderate power, a number of bluish-black dots, which were undoubtedly lead. A piece of white paper pushed up under the edge of

[1] A clinical analysis of sixty-four cases of poisoning by chrome-yellow, used as a cake-dye, by D. D. Stewart, M.D., Medical News, December 31, 1887.

[2] Lead was, however, found to be present by Dr. Leffmann.

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the gum, between it and the neck of the tooth, brought out the dots with great distinctness. The thin edge of gum about the necks of the lower central incisors showed this pigmentation somewhat more plainly.

In still another case not previously reported, in which pronounced symptoms of deterioration in health had occurred, with the appearance of some cachexia, yet with no marked line apparent, there was the same narrow, dotted streak opposite the thin margin of gum grasping the second bicuspid and the adjacent anterior molar on the left side. This case was especially interesting, in that, although the patient lived in the house adjacent to the baker, he had not eaten of the poisoned cakes. It was the discovery of lead-poisoning in this patient that caused me to have a sample of exceedingly yellow noodles, of which he habitually ate very heartily, analyzed. The source of his ill health was here found. The noodles were ascertained by Dr. Leffmann to be heavily charged with chrome yellow.[1]

Photomicrograph. × 120.

In these slighter lines the lead is chiefly gathered in the lumen of the smaller vessels, which it maps out by its presence. The specimen I here show you is of this sort. The minute vessels are beautifully indicated by the precipitated lead sulphide.

[1] It may be of interest to state that the maker of these noodles was subsequently convicted and imprisoned, with the two cake-bakers, for food adulteration.

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In clippings from the affected gum in more pronounced attempt at a *"line,"* yet with no contraction or atrophy of the gum, I have frequently noted that the lead not only occupies the interior of the vessels, but is deposited in their walls and about the intervascular spaces, tending to fill in on all sides the terminal edge of the gingival margin. In such instances as these the mucous membrane shows a disposition to separate from the neck of the tooth, and, because of constriction of its vascular supply, tends later to atrophy. Subsequently, as the lead is freely deposited in the gum, retraction succeeded by absorption of the gingivæ, occurs. A deep blue-line now marks this portion of the affected gum. Subsequently, with continued deposition of lead, the nutrition of the gum is so far interfered with that absorption of the dyed portion about the root of the tooth speedily occurs. The lead sulphide completely occupies all the smaller vessels and the tissues adjacent. The gum is hemorrhagic, bleeding freely on the application of slight friction. Later, with considerable retraction of the gum and exposure of the fang, the former, from atrophy of its margin proceeding irregularly, becomes fringed or peaked. In several families, each composed of a number of members (eight to ten), all of whom suffered, although in varying degree, from eating the dyed buns, all these changes in the gum could be noted at the same time in their various phases. The dotted condition of the thin edge of the gum in one member, the bluish-black slight streak in another; in a third, more severely poisoned, there was apparent a deeper, more pronounced, blue-line, with separation and partial atrophy and retraction of the gingival margin, with exposure of part of the fang of the tooth. In still another member of the same family the fringed condition, with great intensity and broadness of line, was evident. In all of the cases observed in which a well-marked blue-line was noted in the gum (of the labial surface), a similar, though less well-marked, discoloration was also noted in the lingual (inner) gum margin about the necks of the teeth.

It has been stated by writers on the blue-line that in the portion of gum in which no teeth exists no blue-line occurs. I have encountered several interesting exceptions to this. In one of these, in which the teeth were nearly all gone, a line extended along a good

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part of the upper and lower jaw. In this, as in the other cases that I saw with a similar line and absence of teeth, the fangs in many of the sockets yet remained covered by gum. The presence of these had prevented the atrophy of the gum and permitted the development of the blue-line by offering a site for the reception and decomposition of food-particles.

In many of the chrome-yellow cases that were inattentive to the condition of the mouth and ate largely of the cakes the line was often of great depth and intensity, and many of the teeth exhibited a black discoloration; the last and perhaps a portion of the former was due to a direct deposit of lead sulphide from the mouth, through particles of food containing the lead-salt[1] remaining long in contact with the teeth. In the case of the baker's wife, before mentioned, the labial surface of the whole gum in the upper and lower jaw was deeply dyed, besides there being a deep blue-line in the gum of the lower and upper jaw at the junction with the teeth. The teeth were also heavily discolored with lead sulphide.

In cases such as these there could readily occur a similar deposit of lead sulphide on the neck of the tooth adjacent to the gum and beneath the gum itself through the lodgement of food-particles charged with the metal. This would, of course, constitute a local line and be in no way related to that produced by lead precipitated from the blood. In this connection it is important to speak of a pseudo-blue-line which has no relation to lead-poisoning. In certain cases with somewhat uncleanly mouths, yet with the gingival margin well preserved and in approximation with the neck of the tooth, there may appear a narrow blue or bluish-black streak in the gum that is very suggestive of the blue-line of lead-poisoning. This may be due to either a black discoloration of the portion of the neck of the tooth beneath the gum-margin or to a similar staining of the secretion from the gingival organ, which tends, sometimes, to unduly collect here. To avoid error it is important in all cases in which suspicion of a blue-line exists to carefully ascertain if it is intragingival. This can readily be done, and

[1] The chrome-yellow used by the two bakers as a cake-dye was found to consist of lead chromate, 14 to 32 per cent.; lead carbonate and oxide, 47 to 60 per cent.; lead sulphate, 18 to 20 per cent. See as to this, a paper by William Glenn, in Science, May 3, 1889, p. 348.

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should be in each instance, by running a small-sized piece of paper beneath the suspected unattached gum-margin, thus separating it both from the loose débris beneath and from the neck of the tooth also. Should the pigmentation not be intragingival, it will then no longer be apparent, while, if it be due to the deposit of lead in the gum, it will be far more evident.

A word as to persistence of the blue-line after the employment of eliminants of the metal and the removal of the source of poisoning.

Potassium iodide, about the utility of which as an aid to the removal of the metal from the tissues there is no doubt, can have little or no eliminant action on the lead already deposited in the gum. That it will, indeed, for a time be apt to contribute to the latter until lead ceases to be present as a soluble salt in the blood seems more than probable from what has been already stated; but after all the lead has been removed from the tissues, should potassium iodide then be continued, this salt, in process of excretion through the gingival margin, would tend to dissolve the deposited lead sulphide there placed.

Forty-four of the cases of chrome-yellow poisoning were under constant observation for two years for the purpose of observing the later manifestations. Changes occurring in the gums and in the character of the line were carefully noted, with other symptoms. An account of these has been already published.[1] From this record the following observations as to the condition of the gums at the expiration of a year and a half after the cases were first seen may be briefly cited:

"The appearance of the gums and teeth in twenty-four of the forty-four cases is yet indicative of plumbism. But three of the twenty-four received eliminative treatment. A decided though fading blue-line is present in ten; distinctly bluish-purple line in five, and a purple in nine. In twelve of the twenty-four there is much retraction and atrophy of the free margin of the gum, permitting considerable exposure of the neck- and fang-surfaces of the

[1] Subsequent Clinical History of the Cases of Chrome-yellow Poisoning, including a Case of Paralysis Agitans and one of Endocarditis, of Lead Origin.—D. D. Stewart, M.D., Medical News, January 26, 1889.

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teeth, which, together with the crown surfaces in the greater number of the twenty-four, are yet discolored by lead sulphide. The free margins of the gums in many of the twenty-four are hemorrhagic. In these slight friction causes venous oozing. The purple-line is present in the situation previously occupied by the blue."

If the poisoning has been slight and the absorption of lead ceases, the pigmentation slowly fades without destruction of the affected edge of the gum, and no retraction of the gingival margin occurs. In several cases three months after the lead ceased to be ingested the narrow black streak or the fine dotting in the thin edge of the gum was distinctly visible, and at the end of a year the same thin edge was of purple color. The black deposit of lead sulphide persists for months after exposure to the poisoning has ceased, and then gradually fades, giving place to a yellowish-brown stain.

At a variable period following the cessation of the systemic absorption of lead, the extent depending largely upon the severity of the poisoning and whether efforts have been made to eliminate the metal, a bluish-purple discoloration succeeds the bluish in the affected portion of the gum, and it, in its turn, is succeeded by a purplish, and this by a red-line entirely without any element of blueness.

DISCUSSION.

DR. S. WEIR MITCHELL: Has Dr. Stewart observed that where the line was wanting on the gum in front it may be found at the back of the mouth?

DR. F. A. PACKARD: It happened to me last year to run across five cases of blue-line on the lip as well as on the gum, and I was surprised to find that in only two of the works that I consulted was any mention made of this lip staining. These two works were Tanquerel and Osler, the latter quoting Tanquerel's book. I should like to ask Dr. Stewart if it was present on the lip of any of his cases and whether the Fellows of the College have seen it very frequently in their experience.

DR. ARTHUR V. MEIGS: Referring to Dr. Packard's remark concerning the occurrence of the staining of the lip, I have seen it a number of times in the Pennsylvania Hospital in people who came there severely poisoned from the lead works. There has been a patient in my charge within a week who had extensive staining of the lip.

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DR. J. M. DA COSTA: In connection with what Dr. Stewart has said I would like to refer to his remark that Tanquerel quoted cases in which the whole gum was affected. I believe that this is more common than is usually supposed. I have noticed it frequently at the Pennsylvania Hospital, where we often see cases deeply poisoned with lead. Cases of severe lead-poisoning may thus present marked blue-lines, but also streaks on the lips and discoloration of the whole gum.

DR. STEWART: In reply to Dr. Mitchell, I think I stated that in quite a number of cases the line was found not only in front, but also in the margin of gum of the canine, bicuspid, and first molar teeth. Some of them were found on the gum opposite other teeth. As to the small lines, and especially the little dotted lines that do not look like lines at all, but a number of small dots, the recognition of these is of the highest importance. When the whole gums and the inside of the cheeks and the lips are dyed the diagnosis is simple enough; for then, commonly, symptoms of lead-poisoning are so obvious, besides the case being a lead-worker, that search for a line is unnecessary. In other cases in which there are but few of the usual symptoms of lead-poisoning only these small dots in the gingival margins may be apparent. We should always look for these. I always inspect the gums at the side of the mouth, as it is here that the food-particles are most likely to lie longest and from which the hydrogen sulphide is produced. In several of the chrome-yellow bun patients who paid no attention to the condition of their mouths there was very deep discoloration of all of the gums and a part of the inside of the cheeks.

DR. MITCHELL: In his closing remarks Dr. Stewart misunderstood me entirely. I meant to say that where there is no lead-line in the anterior face of the gum there may be one in the posterior part. I think it is necessary in all these cases to use the small mirror for examination.

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FRACTURE OF LATERAL VERTEBRAL PROCESS; RESULTING SCIATIC AND OTHER PAINS.

By JOHN K. MITCHELL, M.D.

[Read March 3, 1897.]

Mrs. D. was referred to Dr. Weir Mitchell by Dr. H. S. Buswell, of Buffalo, in April, 1896, when the following notes were taken:

Her age is thirty-seven years; she was married at twenty-two and is the mother of two sons, aged eight and ten years. She had always been a nervous and excitable person, readily overwrought, and, when thus upset, losing appetite, though always sleeping well. She was the head of her father's house from the age of twelve, when her mother died in childbed; and as menstruation began at this time, the combination of responsibility with physical strain told upon her health. She was employed as a bookkeeper for four years before her marriage. An increasing deafness annoyed her, and she suffered with what she describes as "a sensitive spine," a condition which grew worse after an attack of typhoid fever in 1890 and an accident in 1891, when in moving suddenly backward to escape an exploding rocket she stepped into a post-hole and received a wrench of the back. The spine, especially in the lumbar region, has been very tender ever since; the sciatic pains grew so severe as to suggest an operation for stretching the more painful nerve—the right—which was done without relief. Occasionally the legs twitch or draw up and then shoot out, without her volition, and accompanied by agonizing sciatic pains. These spasmodic seizures have of late been the most prominent cause of complaint. They occur with certainty if she lies on her back, oftenest in sleep, but sometimes when awake. For example, on the day of the examination five such crises of pain had taken place between eleven o'clock at night and four in the morning. For months past she has not lain down at night, in the endeavor to avoid these attacks, but has slept erect in a chair, packed with pillows and arranged so as to allow her to lean a little to the left of the perpendicular position—the posture which gives her the most ease. To rise, to bend, especially to the right, to stand upon the right foot, to walk on hard pavements or upon an uneven surface causes distress in the lumbar and cervical

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regions as well as in both sciatic nerves, the right suffering the most. She is apprehensive, rather discouraged, fatigued by slight mental exertion, and eats almost nothing. The bowels are constipated, and at times she has a flatulent indigestion.

Examination. The patient is slight, though not very thin; exceedingly pallid, with a dead-white pallor; her hair is very gray, but thick. The skin is dry, harsh, rigid, or thickened in parts, notably on the thighs, and covered with large, branny scales, especially on the face and legs. She never sweats at all. The thyroid gland is somewhat hard and wider than normal. There is no anæsthesia. The station, when once she has with great caution and slowness brought herself to an upright position, is perfect.

The knee-jerks are both diminished, especially the right, and are both reinforcible.

There is no tenderness along the sciatic tracks. The pupils respond naturally to light and to accommodative effort.

The optic discs are pale; no hemorrhages can be detected.

There is no uterine trouble, and menstruation is regular and only rarely painful.

A study of the blood gave red corpuscles 2,519,700; poikilocytosis very marked. No increase of white corpuscles. Hæmoglobin, 45 per cent.

The urine, which has been repeatedly examined by Dr. H. S. Buswell with negative results or with the discovery of a slight trace of albumin, due to a few pus-corpuscles, was several times studied without the disclosure of any further abnormality.

The patient's difficulty in lying down; the necessity of extreme deliberation and care in every movement; the natural apprehension with which, although courageous enough, she regarded the process of palpation, made days elapse before it was possible to get even a tolerably satisfactory examination of the spinal regions. When it was done, there was nothing very new developed. There was much general rigidity, evidently, we thought, due to muscular tension and not to any osseous formation. The cervical tenderness described by the patient was somewhat diffuse in that area and not very severe, but from the waist down the whole spinal region was frightfully sensitive; and on the right side, in an ill-defined position at the level of the third and fourth lumbar vertebræ, was a spot so exquisitely tender that it could really not be touched without forcing the patient to cry out in agony. No disturbance of sensation other than this extreme sensitiveness to touch could be discovered.

Even after some weeks of study and careful observation of the patient the questions of diagnosis suggested remained very perplexing. The possibility that the whole disorder was hystero-neurasthenic in its origin naturally presented itself for consideration. The patient had had various nervous strains, had always been excitable, had suffered with the common

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hysterical disorder so often described by the sufferers as a "sensitive spine;" yet she made the personal impression of a person of courage and self-control, although suffering from a most nerve-racking amount and constancy of pain and much worn by the lack of sound sleep, which was impossible in the constrained position in which she spent her nights and days. The changeability, the day-by-day withdrawal or addition of new symptoms, which one learns to regard as cardinal points in hysteria, were never noted in her. The leg- and spine-pains and the twitching were a little better or a little worse one day and another, but never were absent or very greatly increased except by movement or handling. Again, the contraction and sudden extension of the legs occurred most frequently during sleep, or, if when awake, rather when she was quite relaxed than when attention was directed to the lower limbs.

The hardened and slightly enlarged thyroid, especially when considered in connection with the harsh, dry, thickened, and scaly skin and the absence of sweat-secretion, further complicated the case with suggestions of a myxœdematous disorder.

The distinct lessening of the knee-jerks might point to some chronic spinal disorder; but the same diminution is a common result of sciatica, whether of the neuritic or less severe neuralgic type; and, moreover, the patient's station was perfect and the sensibility in all forms unaltered except for the tenderness of a limited area in the lumbar region.

It seemed not impossible that there might be a growth, perhaps carcinomatous, pressing upon the anterior or antero-lateral portion of the spinal column and thus irritating the nerve-roots; but how was this to be reconciled with the long duration of the trouble and with the increased knee-jerks, and how account for the skin-condition?

Final judgment had to be suspended; while the obvious indications for treatment afforded by the very low percentage of hæmoglobin in the blood, the diminution in number and altered shapes of the red corpuscles, the exhausting sleeplessness, the lack of appetite, and the general malnutrition, were met. The pelvic region and uterine organs were minutely examined by Prof. C. B. Penrose with wholly negative results.

Iron was ordered in full doses; massage was given, with great difficulty, owing to the pain caused by any manipulation involving movement of the legs, but its careful application slowly improved the nutrition; small doses of a mild hypnotic secured better sleep, and after some weeks the patient was able to lie down in bed for a part of the time. Small quantities of morphine were given during the latter weeks of treatment, more to lessen the general irritability of the nerves than to cover up the pain. Her general condition gradually improved. The state of the skin grew notably better and the return of slight sweat-secretion was hailed with joy by the patient; but the violent, convulsive movements of the legs lessened very little until about two months had elapsed. The area of tenderness remained

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as sensitive as ever; and finally, when the whole doubtful case had been laid before the patient and her husband, they consented to the exploratory operation which Dr. J. William White, after careful examination of the patient in consultation with Dr. Weir Mitchell and myself, recommended.

Dr. White's account of his opinion and successful operation is as follows:

"The nature of Mrs. D.'s accident, taken in conjunction with her symptoms, seemed to me to point to trouble on the right side of the spinal column, in the region of the lower lumbar vertebræ. I was led to this conclusion by observing her attitude in different positions. There was no suspicion that the symptoms were feigned; besides, she could not have had the information which enabled her constantly to relieve the injured portion of the spinal column, as she invariably did, if it had been an imaginary disorder. The paroxysms were brought on by certain motions of the body. The slightest jar to the bed, for example, would cause her to scream out from the acute pain which was thereby induced. The attitude assumed by the patient in different positions helped, as stated above, to locate the seat of the trouble.

"She was able to lie on the right side comfortably. In standing the weight was borne on the left foot. Both of these positions caused a lateral curvature of the spine, with the convexity toward the right side, which increased the distance between the right borders of the adjacent vertebræ.

"Any motion which caused the spine to assume a convexity in the opposite direction, as lying on the left side or standing with the weight on the right foot, and which therefore approximated the right borders of the adjacent vertebral surfaces, instantly caused agonizing pain, which was invariably located slightly to the right of the median line, in the lower lumbar region.

"New-growth, osteo-periostitis, and pachymeningitis in the same region could not positively be differentiated. In consultation, an operation for the purpose of discovering and removing, if possible, any cause of pressure upon the nerves that made their exit in that region was decided upon.

"The operation was performed May 29, 1896. The patient was placed in the prone position, with a folded pillow under the abdomen, in order to make the lumbar spine more prominent. An incision about four inches in length was made in the middle line, over the spinous process of the third, fourth, and fifth lumbar vertebræ. The muscles were dissected loose from the right side of the spinous processes, in order to admit of ocular and digital examination of the different processes. Nothing could be seen that accounted for the symptoms. The muscles were then dissected from the corresponding position on the left side, but no lesion was found. I then turned my attention again to the right side, and, inserting my finger along the lateral aspect of the superior articular process of the fourth lumbar vertebra, in order to reach the inter-vertebral foramen which gives exit to one of the nerves of the lumbar plexus, the tip of my finger touched a

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piece of rough bone which was found to be a portion of the last-named process that had been broken off and displaced forward. Enough periosteal attachment remained to prevent necrosis of the fragment, which was still ragged and angular. This was removed partly with the gouge and partly with the curette, care being taken not to injure the nerve. A further examination of the contiguous processes revealed nothing abnormal.

"The wound was then closed with silkworm-gut sutures, a single narrow strip of iodoform-gauze having been introduced for drainage. The gauze was removed at the first dressing. The wound ran a sterile course and was firmly healed at the end of two weeks. The patient left the hospital on the 14th of June.

"It was apparent at once that the trouble had been removed at the operation. The following day the patient's bed could be shaken vigorously without causing her any discomfort, although she had formerly experienced agonizing pain upon the slightest motion of the bed. The morphine which she had been getting before the operation on account of the pain was gradually reduced and entirely withdrawn on the 13th of June.

"The stitches were removed on the 10th, and the patient was up in a chair for an hour on the 12th, having experienced no discomfort either in sitting or moving from the bed to the chair and back. At no time after the operation was there any indication of the former pain, and the motions which were agonizing before could be made with impunity."

While we were confident that some form of injury to the cord or the spinal nerves would be found, I believe it is exactly true to say that no one of the several consultants had any idea of fractures playing any part in the production of the symptoms from which the patient suffered. The mechanism of the occurrence of this fracture as described by the patient was curious. It is, of course, possible that in the lapse of several years the order of the occurrence may not have been exactly remembered; but she suffered a good deal of pain at the time, and so had it fixed in her mind. Stepping backward, as is noted in the history, she put her left foot in the hole left by the removal of a post, probably only six or eight inches deep. This threw her toward the left. In the effort to regain her balance she flung herself to the right, but her foot catching in the small hole she was thrown backward. It is likely enough that the lateral fall brought two adjoining processes violently together, and one was in this way cracked or broken and its separation from the vertebral body completed by the further muscular effort to regain her balance. The jagged edges where the

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fracture had taken place were the cause of the violent irritation and the whole of the subsequent symptoms. A case not very dissimilar is within my knowledge, where a man, while coupling cars, was violently bent over sideways between two of them. His earlier local symptoms were almost identical with those which have been described in this case, but a myelitis finally resulted. Dr. Weir Mitchell tells me that he once saw in Dr. Mütter's practice a young woman who was hurt by a blow between the shoulders, and who became consequently bedridden. On examination her spine showed an absence of the sixth or seventh dorsal process. Dr. Mütter, upon cutting down, found the broken process lying to one side, much eroded, but not having formed any abscess. The patient made an easy and complete recovery.

Wherever there is severe local spinal pain, if a history of an injury can be elicited, no matter how trifling or how remote in time, it must always be wise, with the present surgical means at our disposal, to make exploration for the cause in the manner in which we advised this patient. The history of the injury was, both in the patient's mind and in her description, less definite than it appears when written here; and a clear statement was only obtained after repeated questioning, when, probably, thinking about it had brought back the details. The exclusion of other possibilities left us finally with the supposition of some injury of the spine, whether from this accident or from a growth no one knew or could know until the knife revealed its nature. I may add that I have within the last week seen the patient, and that she has made, considering her long period of invalidism and her previous history, what may be looked upon as a very complete recovery, no trouble remaining except an occasional sharp pain on performing certain movements, especially rising from recumbent and sitting positions, and a small amount of stiffness or awkwardness in the back muscles. Both these difficulties are probably due in part to long habit of pain, in part to the wound of the operation and the resulting cicatrix.

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THE MIMICRY OF TUMOR OF THE BRAIN IN BRIGHT'S DISEASE.

By CHARLES W. BURR, M.D.

[Read March 3, 1897.]

It is well known that local cerebral symptoms without gross focal lesions may occur in Bright's disease. Everyone who has had much pathological experience has seen cases of hemiplegia identical in type with those due to cerebral hemorrhage, having the contractures, the spastic knee-jerk, and the persistent ankle clonus, which yet at necropsy showed no adequate focal cause. Everyone who has had much clinical experience has seen cases of Bright's disease in which, both in the condition of uræmic poisoning and in its absence, there have occurred transient monoplegias or hemiplegias as characteristic as those of brain syphilis. In fact, in by far the larger number of cases of palsy resembling in onset and character those due to cerebral hemorrhage, but without adequate visible post-mortem lesion, there is an accompanying chronic nephritis. It is the commonest cause. On the other hand, it is doubtful if a hemiplegia chronic in onset, developing in the slow way most frequent in tumor of the brain, is ever Brightic.

General epileptiform convulsions are common enough in uræmia. They are part of the classical picture. But local convulsions without visible organic change in the brain also occur. For example, several years ago, as I sat by the bedside of a woman deep in uræmic coma, waiting for death, she was seized with violent clonic spasm of the left arm and face. As the hours passed the spasm recurred several times, and always in the same part. She died without regaining consciousness. I thought it probable that post-

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mortem we should find a small subcortical hemorrhage or thrombus; but it was not so. The brain showed no local lesion in the motor area. There was atheroma of the vessels at the base, a slight cloudiness of the pia, but no acute meningitis. The smaller vessels of the brain were gorged with blood, but there was neither hemorrhage nor thrombosis. The brain was rather wet, without, however, any distinctly localized œdema, and the convolutions were all slightly shrunken, the fissures shallower and broader than normal. Such a case is not isolated, rather it is frequent; and if hemiplegias and local convulsions were the only nervous symptoms occurring in nephritis the diagnosis from brain tumor would be simple. But, unfortunately, other symptoms occur. All the general and almost all, if not all, the focal symptoms of brain tumor may develop and without lesion discoverable by any means at ordinary command. I know of no better example of the mimicry of general symptoms than occurred in a case some months ago. She came to the hospital immediately before the lecture-hour, complaining of violent, localized, right frontal pain, great vertigo, repeated attacks of vomiting, and a staggering gait. Time for examination was short, the material for the clinic not abundant, so I lectured on her learnedly as a case of brain tumor, and gave a careful list of points in differential diagnosis between it and chronic nephritis, and after the class was dismissed had her eyes examined and found an albuminuric retinitis, and examined her urine and found tube-casts and albumin. Under treatment directed to her kidneys she improved quite a great deal. Therapeutics has so far delayed post-mortem diagnosis, but I have no doubt she has chronic nephritis, and it alone. Her strictly localized head-pain was interesting. Such pain is of little if any localizing value in tumor, but is frequent; but the head-pain of nephritis is almost as frequently local, usually in the occipital region. Her staggering gait was due to weakness and vertigo and was in no sense an ataxia. In this case the examination of the eyes gave aid; in the next the eye-condition complicated the problem. It was a man, fifty-eight years old, a merchant, of good habits and excellent previous health. About a year before I first saw him he had an attack of sudden unconsciousness. The exact nature of the seizure could not be

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learned. He came to me complaining of general weakness and violent headache, with some vertigo and occasional nausea and vomiting. He was much depressed, a little forgetful, and unnecessarily worried about his business affairs. Indeed, this last element almost amounted to delusions of poverty. He was pale and emaciated. His station was fair and gait good. The knee-jerks were normal. The pupils were equal and reacted well to light and with accommodation. The only objective signs of disease were slow, hesitating speech, a heart with a somewhat enlarged area of dulness and an accentuated second aortic sound. The urine was normal in amount, of low specific gravity, and contained a distinct trace of albumin and a few hyaline casts. Chronic nephritis was diagnosed. He did not improve under treatment; on the contrary, one day he had a convulsion, which, according to his wife, began in one hand, became general, and was accompanied by unconsciousness. He had several similar convulsions during the last three months of his life. A very excellent oculist who knew the renal condition examined the eyes and reported papillitis. He said that notwithstanding the undoubted occurrence of optic neuritis, due to Bright's disease, he felt quite sure that in this case there was a brain tumor. A few weeks later the patient fell suddenly in coma, without convulsion, and died in a few hours. The autopsy revealed some atheroma of the vessels at the base, but no local lesions within the brain-mass. The dura was slightly adherent to the skull. The brain was rather hard and distinctly shrunken. The kidneys were the seat of a chronic nephritis, evidently of very long standing.

The next case I saw only in death, and know her history but in outline. After an attack of what was called influenza, she began to have severe pain in the back of the head and neck. There was at times numbness in the hands. She complained for months of vague symptoms of ill-health and general weakness. When first seen by her physician the urine was normal. She had occasional vomiting. There was at times extreme rigidity of the neck. Suddenly convergent strabismus developed. Two very excellent oculists examined her eyes and reported great papillitis, and gave it as their opinion that there was very probably a brain tumor. Ptosis of the left lid came on. The urine now contained much albumin,

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granular and epithelial casts. The rigidity of the neck became so great that lifting the head raised the shoulders. She became stuporous and died. Post-mortem I found the following: There was no meningitis. Indeed, the base of the brain appeared, macroscopically, in all regards normal. Just outside of the right optic thalamus, and not affecting the internal capsule, was a very recent red blood-clot about the size of an almond. There was a minute hemorrhage in the left lobe of the cerebellum. The posterior horns of both lateral ventricles were slightly dilated. There was very advanced chronic nephritis. The next case is of slight value, for it was not studied. Indeed, it was not seen until a few hours before death. She was an old woman who had been in the outwards (almshouse) of the Philadelphia Hospital for a long time, suffering from a left-sided hemiplegia, but able to be about, never complaining, never asking to see a doctor. Suddenly one morning she fell in a fit and was transferred to the nervous wards. When I saw her she was in uræmic coma. Her urine contained albumin and tube-casts. The fits recurred, and were most marked on the palsied side. We assumed that the hemiplegia was due to an old cerebral hemorrhage. She died in a few hours. Post-mortem we found a large, flat tumor of the dura over the right frontal region and pressing somewhat on the motor area, and chronic nephritis. She died from the Bright's disease, there is no doubt; but had she been under observation earlier the tumor might have been diagnosed—an intellectual satisfaction, even though it would have led to no therapeutic result. One of the most interesting cases I have seen occurred in the practice of a friend. A young man without any history was brought to a hospital. He had such severe mixed aphasia that he could give no account of himself. He could not write, not, as we learned later, on account of agraphia, but because he had never been taught. There was slight lower, right-face palsy. At first his urine was normal. The eye examination, made by skilled men, showed minute changes which could have been caused by either a tumor or Bright's disease. The question of operation was discussed; but, as after several examinations of the urine albumin and casts were finally found in a few specimens, it was decided to wait. He soon after began to improve

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very rapidly, until now he only occasionally misuses words. There is still a slight drawing of the mouth to the left side. In the absence of an autopsy it is impossible to make a sure pathologic diagnosis. He certainly did not have a tumor. He most probably had a small hemorrhage or partial thrombosis of an artery. He may have had no gross organic disease at all.

I do not wish to be supposed to believe, from the cases reported above, that the mistaking of the nervous symptoms of Bright's disease for tumor of the brain is frequent. It is not, but yet occasionally this mimicry is so good as to deceive even the most skilled. Nor does the positive proof of the existence of one exclude the other, and the problem requiring the greatest diagnostic skill in these mixed cases is to tell which symptoms are caused by the tumor and which by the kidney disease—a problem not infrequently insoluble. The old view that choked disk is practically pathognomonic of tumor is now known to be false, and ophthalmologists are agreed, I believe, that Bright's disease may produce changes in the fundus indistinguishable from those of new growth. Albumin and casts may be absent in cases of chronic nephritis over long periods of time. On the other hand, it is often taught that albuminuria sometimes occurs in cases of tumor without organic kidney disease. I am not prepared to deny it, but do not know that all the cases on which the opinion is based came to necropsy and proved to have normal kidneys. The palsies of Bright's disease are always sudden in onset, but the palsies of tumors are not always slow in development.

Several theories have been advocated in explanation of the local nervous symptoms occurring in Bright's disease without gross organic lesion. Local œdema of the brain, local nutritive changes due to poor blood-supply caused by disease of the vessels, direct poisoning of the cells themselves by some toxin—all these have been argued for. As to local œdema, it is very difficult to tell post-mortem whether it has existed during life or not. There may be such a thing as local œdema without a focus of organic disease, but I must confess I have never seen it except surrounding an area of distinct organic lesion. I have never seen what we might call idiopathic local œdema. Further, it is extremely doubtful if

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it could by mere pressure cause symptoms. It is more probable that when local œdema does occur it is merely a result of the same cause that produces the symptoms, namely, a blocked vessel, rather than that it is itself a cause of the symptoms. As to the poisons of Bright's disease or to the secondary poisons which it produces, we are still in the region of pure theory. It is perfectly true that the blood may carry a substance or substances poisonous to nerve-tissue, and that nerve-cells may have the power of selective action in receiving or refusing it or them, as they do with other poisons; but as yet this is not proven.

The bloodvessels within the brain are very often diseased in chronic Bright's disease to a greater or less degree. This must affect cellular nutrition, and it is easy to understand that such a disturbance of nutrition should not affect all parts equally; that while most of the brain is able to perform its functions some one area should be so affected as to produce symptoms, though post-mortem it may appear fairly healthy. Finally, some cases are certainly due to thrombosis of the smallest vessels; but this brings us into the class of distinct visible lesions, with which we now have no concern.

DISCUSSION.

DR. JAMES TYSON: I have nothing to add except, from the standpoint of a considerable experience in Bright's disease, to confirm all that Dr. Burr has said. I do not think there is any form of hemiplegia, nor monoplegia, nor headache which is commonly accounted for by tumor of the brain which could not equally well be accounted for by Bright's disease. Hemiplegia sometimes succeeds convulsions, and we have the more likely explanation in the result of the pressure due to the œdema which is likely to result from resistance to the onward flow of the blood. This is also speculative, but the later symptom is more easily explained than in those cases where there have been no convulsions.

DR. D. D. STEWART: A careful examination of the urine in cases such as Dr. Burr describes should certainly lead to the correct interpretation of the case. Dr. Burr's cases indicate the extreme importance of what I have long held, that the urine should be carefully examined in all obscure cases whether renal disease be suspected or not. If there is a probability of renal

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disease being present, the mere absence of albumin should not preclude careful search for casts. This I have time and again pointed out. With proper search I believe casts will never be found absent in cases of chronic nephritis in which marked uræmic symptoms are present, although albumin may be. This a large experience has taught me. If but little sedimentation has occurred in a specimen, and casts cannot be found in this by the employment of the centrifuge, then an examination of the sediment obtained by gravity of the twenty-four-hour urine should be made, the centrifuge employed on the gravity sediment if sediment is but scanty. This is my usual practice. More than this, an examination of the nitrogenous output for several days should be made, the amount of urea in the twenty-four-hour urine being calculated from the mixed specimen of the whole amount; allowances, of course, being made for body-weight and diet. If urea examination cannot be readily made, as, indeed, it ought always to be, for the clinical methods are of the simplest sort, then, at least, the specific gravity, with allowances for temperature, should be taken of the mixed twenty-four-hour urine, and thus the total urinary solids estimated. If this is done as a matter of routine in suspected cases, mistakes in diagnosis, such as Dr. Burr speaks of, can, I should think, not often occur.

DR. S. SOLIS-COHEN: I should like to ask Dr. Burr whether, in the cases of Bright's disease simulating cerebral lesion—whether hemorrhage, thrombosis, embolism, or tumor—he has not found marked differences from time to time in the severity of the symptoms and in their distribution, and whether the same variation would be found in cases of organic cerebral lesion?

DR. BURR: In answer to Dr. Cohen's question I would say that the non-organic hemiplegia occurring in Bright's disease may be as permanent and vary as little in severity from time to time as the hemiplegia from tumor or other gross lesion. As to albumin and tube-casts, I can only say that it is quite certain they may be absent from the urine in cases of chronic interstitial nephritis for quite long periods, say several weeks. Further, it must be remembered that there were no errors in the diagnosis of Bright's disease in the cases I have reported. The difficulty is to determine the existence or non-existence of brain tumor, and if both kidney disease and tumor be surely present to tell which symptoms are to be referred to the one and which to the other condition; the mere discovery of Bright's disease will not lead to the correct interpretation of a case when the question is, Has a patient brain tumor? since both diseases may coexist.

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A CONTRIBUTION TO THE STUDY OF THE ACTION OF THE VENOM OF THE CROTALUS ADAMANTEUS UPON THE BLOOD.

By S. WEIR MITCHELL, M.D., and ALONZO H. STEWART, M.D.

[Read March 3, 1897.]

The numerous individual experiments are not of such interest as to need full relation. It will suffice at this time to relate some of the conclusions. It has been determined in France by Calmette, and in Scotland by Fraser, that by using successive small doses of venom immunity can be obtained to fifty times the fatal dose. It has been concluded that the serum of relatively immune animals is protective and more or less curative when injected. We do not consider this as certain. We desired to know if the immunity obtained from numerous sublethal doses was to be seen in the blood itself; also exactly to determine the nature of the blood-changes discovered by one of us (Dr. Mitchell) many years ago, and to find the effect on the venomed blood of oxidizing agents. The blood in every case was placed on a slide, sealed, and kept at normal blood-temperature.

Human Blood. Normal human blood on carefully prepared slides kept at 37.5° C. showed no marked change in forty-eight hours. In seventy-two hours the erythrocytes were crenated and the amœboid motion of the leucocytes had entirely ceased. After 144 hours the corpuscles were all broken down.

In *blood and venom*, 20 *cm.* of each, thoroughly mixed and preserved from the atmosphere, the erythrocytes at once became globular, 3 to 5 microns in diameter, and more highly refractive. The color changed from a greenish-yellow to a light chocolate tinge, and

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in many of the slides the corpuscles became quite adherent, sticking together in large clumps or drawn out in long stringy masses. These strings of corpuscles often show the erythrocytes drawn out to the length of 20 microns. The tendency of the corpuscles to form rouleaux seemed to have entirely disappeared.

The leucocytes were reduced from 18 and 20 microns to 10 and 12 in diameter, and became more refractive at the borders. The amœboid movement at once entirely ceased. Examination in twenty-four hours showed the erythrocytes losing color, the strings having disappeared; but the aggregation in clumps was still marked except where the layer of corpuscles was very thin. In the very thin layer of blood the formation of small oblong crystals from the erythrocytes was noted. At first the corpuscle became square, and then several faint lines parallel to each other appeared on the surface. These lines finally marked the division into oblong crystals. These crystals after a few days became very much larger. Examination in 144 hours showed the erythrocytes in the majority of the slides had lost nearly all their hæmoglobin, and were consequently quite pale; but there was no sign of any general disintegration of the corpuscles.

Blood and normal salt-solution, equal parts, when mixed showed no notable immediate effect; but in seventy-two hours the corpuscles were all broken down.

The Action of Dried Venom upon the Human Blood. The dried venom was dissolved in sufficient water to make the specific gravity 1.035, which is about the specific gravity of fresh venom. Blood and this solution of dried venom were mixed in the usual way, and at first there was no apparent effect; but in about three minutes the corpuscles became globular, 3 to 5 microns in diameter, and were quite highly refractive. The leucocytes became smaller and the amœboid motion stopped. In seventy-two hours all the corpuscles were broken down and all the crystals that had been formed in the first twenty-four hours were destroyed.

Crotalus Adamanteus Blood. Normal-blood erythrocytes are oval and nucleated, and when placed under the usual conditions were broken down in twenty-four hours.

In *blood and venom, 20 c.mm. of each,* the corpuscles showed no

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effect from the venom except a stopping of the amœboid motion of the leucocytes. After ten days the corpuscles were not broken down. Other mixtures of blood and venom were made, as was done with the blood of other animals, but the venom produced no effect upon the corpuscles in any dilution. In the dilution the corpuscles were not broken down in 124 hours.

Many rabbits were immunized, but only in one animal did we reach the immunity of fifty times the fatal dose. The blood of this animal showed an interesting relative lack of power to be altered by mixture with venom.

The Action of Venom upon the Blood of a Rabbit Immune to Fifty Times the Lethal Dose. Normal blood contained about 10,000 leucocytes to the c.mm., and the immune blood about 75,000 per c.mm.

Blood and Venom, equal parts. While the normal rabbit-blood showed immediate characteristic alterations of the corpuscles very similar to those seen in the human blood, in the immune blood the erythrocytes retained their normal size and appearance for about one-half hour, and then only slowly assumed the small globular appearance. The amœboid movement still continued. In the other dilutions with less venom the immune blood showed delayed and lessened reaction on every slide.

The Action of Venom upon the Blood of a Rabbit which had Received Subcutaneous Injections of Potassium Permanganate. Five cgms. of potassium permanganate in 5 c.c. *of water* were injected subcutaneously every day for one week, and the blood then tested with the various solutions of venom. There was no apparent counteracting effect to the venom.

The Examination of the Blood of a Rabbit Intoxicated with Alcohol. The venom seemed to have a more pronounced effect upon the corpuscles even in the weaker dilutions, and the corpuscles were broken down in one-half the usual time required for normal blood.

The Effect of Potassium Permanganate and Venom upon Monkey-blood. A saturated solution of potassium permanganate mixed with normal blood gives only a slight increase in the size of the erythrocytes. If the blood and venom be mixed so as to alter the corpuscles and the mixture then be brought in contact with the

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potassium permanganate solution under a cover-slip, the erythrocytes can be seen to again assume their normal size—6 microns in diameter; the biconcavity returns, and the corpuscles are not broken down for weeks.

The Effect of Calcium Chloride (1 *to* 60) *on Blood and Venom.* When blood previously altered by venom is brought in contact with calcium chloride solution (1 to 60), no effect whatever appears to be produced upon it.

The Effect of Potassium Permanganate upon Human Blood and Venom. The erythrocytes when primarily acted upon by the potassium permanganate solution became slightly smaller and a little discolored, but retained their biconcavity.

Blood and venom, mixed in equal quantities and brought in contact with the potassium permanganate solution, show at the line of contact the small globular corpuscles floating into the permanganate solution, becoming in a few seconds biconcave and normal, or a little larger than normal, in size. This action was observed on one occasion as late as one hour after the blood had been mixed with the venom. Hydrogen peroxide has a similar action to the potassium permanganate solution upon the corpuscles that have been affected by the venom, bringing them back to their normal contour and size.

Twenty-three series of observations were made on the blood of many animals. The complete paper, with numerous illustrations, will be offered for publication by the National Academy. We hope to take up next the question of immunization and the influence of serum of protected animals.

DISCUSSION.

DR. ALFRED STENGEL: I know nothing about the action of snake-poison, but have been interested in similar work on the red blood-corpuscles, although my studies have been along the lines of the blood diseases. Starting out with the presumption that the anæmias are probably largely diseases primarily of the blood-plasma and the juices of the body, and that the corpuscular changes are to a large extent the result of changed conditions in

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the liquids, I have studied the red corpuscles in various conditions somewhat in the same manner that Maragliano and Castellino have done. My plan has been to take the blood in various diseases, such as pernicious anæmia, chlorosis, and leukæmia, or other conditions affecting the character of the serum, such as compression and cyanosis induced by applying a ligature about a finger; to separate the serum and then subject the corpuscles of healthy individuals to the action of this serum. I am very much interested to learn that the red corpuscles were changed in much the same way as they were under the influence of the venom used by Drs. Mitchell and Stewart. In the work of Maragliano he described two classes of changes: first, the endoglobular; and, second, total necrosis. The endoglobular changes are found within the substance of the corpuscle and are of various degrees of severity. The total necrosis leads to poikilocytosis. In my experiments I have found to some extent the same changes that are illustrated in the drawings exhibited to-night, including the globular form of erythrocytes. In some of my experiments I have been amazed at the rapidity of the change. This was especially true in the cases in which I used destructive heat. One of my experiments is to ligature a finger until it becomes blue, then freeze it until it is icy; then prick the finger and take the first few drops. In this way I relieve myself of any accusation of having brought in external mechanical changes. In this blood I have been able to demonstrate quite a number of these globular forms of red corpuscles. When this blood which has been congested and then frozen is subjected to a temperature a little above normal these changes come on with startling rapidity, and immediately the field of the microscope is full of these bodies. I think that the experiments that I have made substantiate those which have been reported here to-night and show that these changes are real forms of degeneration. I say this because it has been held by some hæmatologists that the changes which Maragliano found were productions of his mode of work and were not true forms of corpuscular degeneration. These experiments, it seems to me, show that these are forms of degeneration which red blood-corpuscles undergo. My interest in the matter is to find the particular changes which red blood-corpuscles undergo within the living body. Where these occur, how they occur, and in what form seems difficult to explain. It is interesting that in these experiments and in the work that has been published the so-called shadow-cells have not been seen. Ordinarily, hæmatologists regard the shadow-cells as being the most decided expression of hæmocytolysis that we have. These changes are not seen in these experiments, and their position has not been solved.

DR. STEWART: We have not tried Dr. Stengel's method. As to the phantom corpuscles they were noted in the normal blood, and are shown, I believe, in some of the photographs that I have taken. They were not shown in the field that I saw under the microscope, but they would show

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up distinctly in the photograph. Whether they disappeared or became globular and appeared just as the other corpuscles did I cannot say. Dr. Mitchell, many years ago, studied the effect of the venom upon the blood of rabbits by injecting the venom into the rabbits and immediately studying the blood, when he found similar changes to those already described, but not to the same degree. The dilution is very much greater. We used dilutions from equal parts down to one part of venom to ten thousand parts of blood. When the dilutions were higher than one to two thousand there were rarely any changes noted. When we got lower than this marked changes were seen.

DR. MITCHELL: What Dr. Stengel said interests me very much. It is quite possible that these changes may be due to a loss of oxygen, and it is the restoration of the oxygen by the permanganate that possibly brings about this change. I beg to suggest to Dr. Stengel that he try the use of permanganate of potash to see if it will act to alter again the form of the corpuscles.

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FRACTURE OF THE LOWER END OF THE RADIUS, WITH FORWARD DISPLACEMENT.

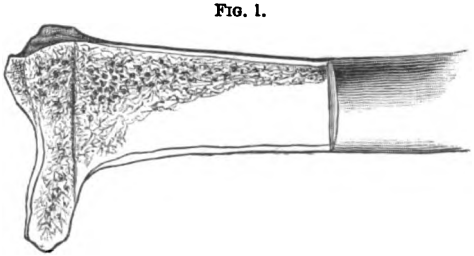
ILLUSTRATED BY SPECIMENS, PHOTOGRAPHS, AND CASTS.

By JOHN B. ROBERTS, M.D.

[Read April 7, 1897.]

My object this evening is not so much to discuss the pathology and treatment of this injury as to show some casts and photographs of the lesion, which I purpose placing in the Mütter Museum, and to exhibit to the Fellows three interesting specimens already belonging to that valuable collection.

Fig. 1.



Probable epiphyseal fracture. (Mütter Museum.)

A recent study[1] of this fracture has convinced me that its occurrence is not very rare, and that its recognition is not general. Within a few years I have seen four cases, all of which had previously been under professional care. Yet in none of them had the deformity been reduced; and in the history of three, if not of

[1] Transactions American Surgical Association, 1896.

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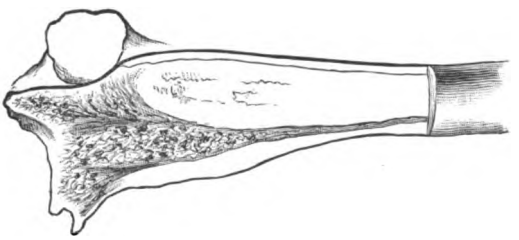
all four, it was evident that the true character of the injury had not been suspected.

Well known is the widespread ignorance in the profession of the necessity for *very forcible immediate reduction* of the inferior fragment in the usual fracture of the lower end of the radius with backward displacement. It seems as if there exists an even greater degree of ignorance or forgetfulness of the possibility of the displacement occasionally being forward instead of backward. If the possibility of such displacement is generally recollected, it must be that the necessity for forcible primary reduction is not appreciated; for in the cases seen by me and in many of the photographs here exhibited the deformity has not been reduced.

FIG. 2.



Fracture with probable stripping up of periosteum. (Mütter Museum.)

This lesion, sometimes termed "Smith's fracture of the radius," at other times called "reversed Colles's fracture," may be produced, if my experimental and clinical studies are correctly interpreted, in three ways:

1. Tearing off of the lower end by a cross-breaking strain exerted through the posterior ligaments during extreme flexion, when the force is applied to the back of the hand in front of the anterior surface of the radius. 2. Crushing of the anterior portion of the bone between the wrist-bones and the shaft, or mutual penetration of the diaphyseal and epiphyseal portions. 3. Rupture of the bony tissue of the weakest point by decomposition of the force to which the limb is subjected. It is possible that there may be at times a combination of more than one method.

In a recent case treated by my colleague, Dr. M. J. Stern, at the Polyclinic Hospital, the character of which was proved by an

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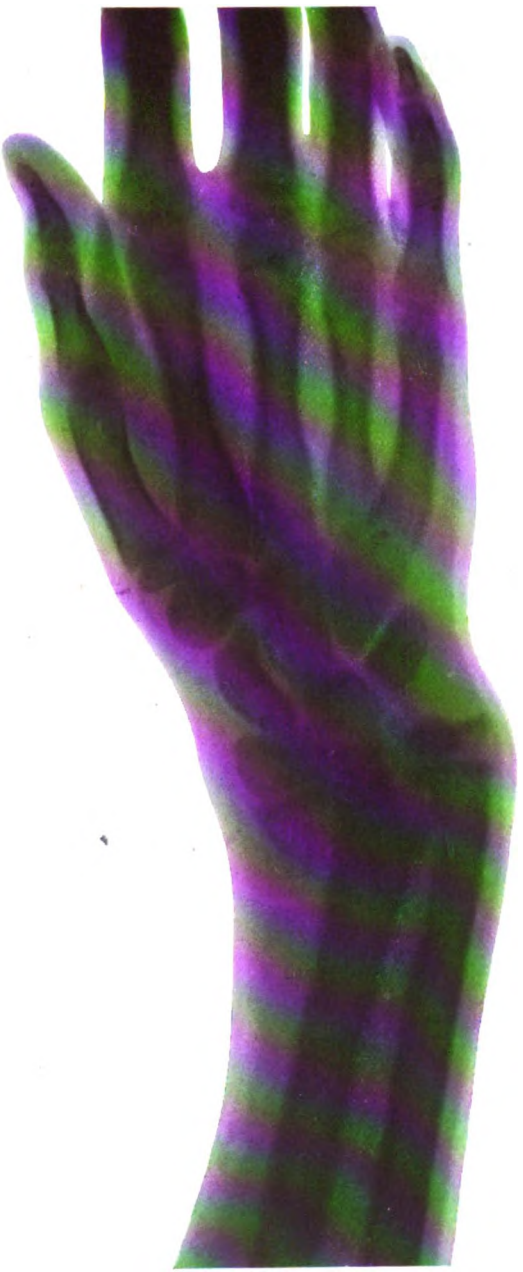

Fracture of the lower end of the radius, anterior displacement of lower fragment. Ten minutes after injury.

Case of, and skiagraph by, Dr. Max J. Stern, April, 1897.

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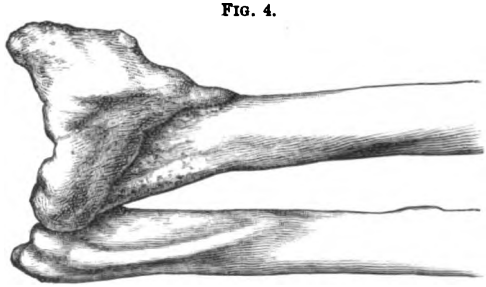
immediate skiagraph taken by Dr. Stern, the boy seemed to have received the blow on the palmar surface of the ulnar side of the hand. He was mounting a horse, and fell over on the opposite side of the animal. When examined shortly afterward, the damage done to the skin of the hand by impact on the ground was found on the palm of the hypothenar eminence and on the ulnar border of the hand. The displacement forward of the lower fragment and the over-riding of the upper fragment upon its dorsum are beautifully shown in the skiagraph, which Dr. Stern has brought here to-night. Forcible reduction was at once performed, and the boy now has an excellent arm with little or no deformity.

It can be understood, I think, how such a blow might tend to displace the radial bone forward rather than backward. A fall directly upon the whole palm usually tends to forcibly extend the wrist-joint, and is one of the methods of producing the classic fracture with backward displacement. This blow coming on the ulnar portion of the hand might readily, it seems to me, drive the lower fragment forward without extending the wrist-joint.[1]

FIG. 4.



Oblique fracture. (Museum of Trinity College, Dublin.)

The deformity in this fracture is quite different from that in the ordinary injury with backward displacement. The degree naturally varies with the amount of displacement and the obliquity or transverse character of the line of fracture. It may be almost absent or be very great. Sometimes the displacement is almost

[1] Mr. Lucas has reported, in Guy's Hospital Reports for 1884, an open fracture with forward displacement, caused by force applied to the palm. His paper has interesting illustrations of the case.

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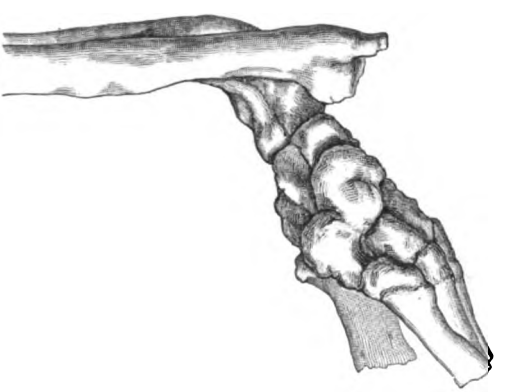
altogether forward, at other times it is comparatively slight forward, but very marked in a radial direction. The photographs here shown illustrate these variations very well. The Edinburgh and New York specimens have marked forward displacement; the specimens from the Royal College of Surgeons in Ireland marked lateral displacement toward the radial aspect of the forearm.

The deformity of the forearm and wrist is characteristic in instances where the carpal fragment is much displaced forward. An elevation is seen across the back of the forearm, running obliquely upward from the ulnar to the radial side. The ulnar portion of this elevation is the more prominent, and is made by the head of the ulna, which was left behind when the carpal fragment of the radius with the attached hand was carried forward by the injury. On the radial side of the limb the elevation is further from the hand and is less prominent. It is due to the lower end of the upper fragment of the radius.

FIG. 5.



Fracture with great forward displacement.
(Museum of Royal College of Surgeons, Edinburgh.)

This dorsal prominence is quite different in appearance from the hump on the radial side of the dorsum seen in the fracture of the lower end of the radius with backward displacement of the carpal piece. In the latter case the elevation is great on the radial half of the limb, and the surgeon's finger carried along the back

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of the shaft of the radius can readily feel the ledge of bone corresponding to the dorsal surface of the lower fragment. The ulna makes little or no prominence on the back of the forearm in the classic fracture, though in both forms it is apt to be prominent at the ulnar edge of the limb, because the outward displacement common in both instances carries the hand away from the head of the ulna.

FIG. 6.

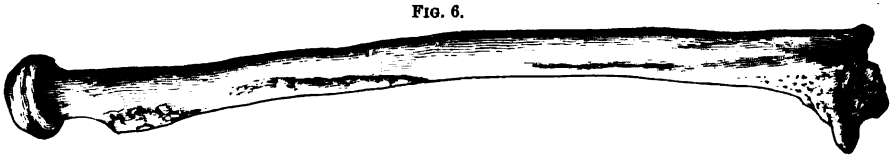
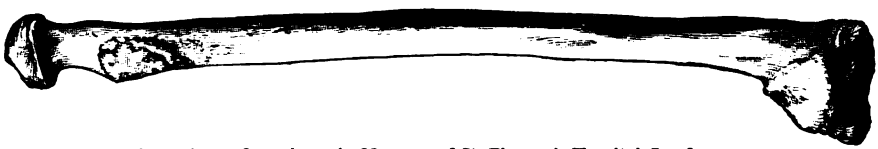


FIG. 7.



Two views of specimen in Museum of St. Thomas's Hospital, London.

In the fracture under consideration the surface slants downward from the dorsal elevation toward the back of the hand, whose plane is at a lower level than that of the forearm, but more or less parallel to it.

This slant in the surface below the dorsal elevation causes somewhat the appearance of a furrow across the forearm, which is deeper just below the head of the ulna. Pressure with the fingers will make this hollow more evident, and show that the lower end or base of the radius occupies a position more anterior than normal. The sulcus, as the elevation, is, on the radial side, a little further from the hand.

The lower fragment will usually be felt as a hard mass under the flexor tendons, and evidently not belonging to the ulna.

Lateral deviation toward the radial side of the forearm is probably usual. This specimen from the Mütter Museum is an extreme example of this lateral deformity due to a crushing or absorption at an oblique line of fracture.

The tendency to lateral displacement causes the radial styloid to ascend toward the elbow in this fracture as in that with backward displacement of the lower fragment.

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The treatment is simple if the fracture be only recognized—immediate and *forcible* reduction to restore the contour of the lower portion of the radius, followed by the application of a moulded splint of metal or gypsum to the palmar surface, or of a straight splint to the dorsum. There is little or no danger of muscular displacement. The displacement is due, as in the classic fracture, to the vulnerating violence, not to muscular action. The so-called Bond's splint often injudiciously employed in the classic fracture is equally undesirable here.

DISCUSSION.

DR. JOHN ASHHURST, JR.: This variety of fracture has generally been considered rare, and I am still of the opinion that it is so, as I have observed it in only a very small proportion of cases. The explanation is, I think, that the force is usually applied in such a way as to cause backward displacement, the fracture occurring by what is called a "cross-breaking strain," as pointed out by Dr. Gordon, of Belfast. When the patient feels himself falling he unconsciously puts out his hand, and the weight of his body is commonly sustained by its palmar surface coming in contact with the ground, the hand being forcibly extended, and, when the bone gives way, the lower fragment going backward and upward. In the rare cases in which the fall is received with the hand in the opposite position, the mechanism is exactly reversed, and the lower fragment is pushed forward and upward instead of backward and upward. The former is a common occurrence, and the latter very uncommon, the anterior displacement being, as a consequence, much rarer than the posterior.

DR. G. G. DAVIS: I have diagnosed oblique fracture of the radius into the joint, such as is seen in one of the photographs. As regards the question of the fracture taking place in flexion or extension of the hand upon the forearm, I have often made inquiries as to the manner of the production of these fractures, and in many cases have gotten a perfectly clear and distinct history of the fact that the hand was doubled under the person in falling; that is to say, the hand was flexed anteriorly toward the palmar surface. It is possible that in some of those cases in which the fracture was so produced the fragment may have been displaced toward the palmar surface. This displacement is so situated beneath the flexor tendons and beneath a large quantity of soft tissue that the exact position of the fragment cannot be determined so well as when it is placed posteriorly and only beneath the extensor tendons. Anterior displacement should be looked

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for especially in those cases in which the hand is markedly displaced toward the radial side.

DR. FRANK WOODBURY reported briefly a case of fracture of the radius extending into the articulation, without deformity, occurring in a man, aged thirty-four years, the injury resulting from a fall upon the palm of the left hand, caused by being knocked down by a bicycle while crossing a street. Crepitus was detected, but as the patient insisted that there was no fracture a skiagraph was taken by Dr. Stern at the Polyclinic Hospital, twenty-four hours after the accident. A print was exhibited, showing part of the forearm and hand, which demonstrated clearly the existence of a transverse fracture of the lower extremity of the radius with a very well-marked line extending into the joint, making a T-shaped fracture. It was evident in this case that the X-rays had obviated the former necessity of a resort to anæsthesia for purpose of diagnosis.

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THE RAPIDITY OF ABSORPTION AND ELIMINATION OF SOME COMMONLY EMPLOYED DRUGS AS A GUIDE TO THEIR ADMINISTRATION.

By H. A. HARE, M.D.,
PROFESSOR OF THERAPEUTICS IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA.

[Read April 7, 1897.]

THE knowledge of the effects of drugs upon the human or animal organism is a *sine qua non* of successful therapeutics of a rational type, and its importance is so great that any argument in support of a closer study of the action of remedies is useless. Too often, however, we study the effect of the drug upon the different organs upon which we wish it to exercise a particular influence, and ignore its influence upon the organs of absorption and elimination, although the speed and manner of absorption and elimination should govern our dosage as to size and frequency. The direct influence of the remedy as it passes through the absorbing organs and those of elimination may be great.

A study of modern medical literature reveals a distressing lack of attention to these points, and we find careful practitioners ordering drugs which are slowly eliminated very frequently in twenty-four hours, and drugs which are rapidly eliminated very seldom in twenty-four hours, with the result, in the latter instance, of practising what an eminent therapeutist has called "kangaroo therapeutics," viz., a great effect of short duration at long intervals. Thus to give dilute hydrocyanic acid three times a day for the relief of cough will produce a sedative influence of a powerful character, which will last at the most but a few minutes and leave the patient unmedicated for several hours; and the use of ammonia as a stimu-

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lant in a similar manner is equally futile. On the other hand, the frequent administration of digitalis or the bromides is unnecessary, for these drugs are so slowly absorbed that the system receives a gradual dose, so to speak, and they are so slowly eliminated that if the doses are frequent the drugs simply accumulate in the body and produce an excessive effect. All drugs cannot be arbitrarily divided into those which are slowly and rapidly absorbed and eliminated; but some drugs do lend themselves to such a classification, and some of those which are slow of absorption are slow of elimination. It is because drugs which are slowly eliminated are frequently given too often in twenty-four hours that the so-called "untoward effects" of many of them are developed, and in reality a large number of drugs produce a cumulative effect, although this term is usually applied to the effect of the excessive use of digitalis. The difference between the effect of digitalis when it accumulates is that some change in the position of the patient may bring on the symptoms suddenly, and therefore a greater impression is made on the mind of the physician and perhaps on the body of the patient.

The reliable information that we have as to the absorption and elimination of drugs is by no means as complete as is desirable. No part of pharmacological study is more neglected. In many instances no studies as to the elimination of important remedies have been made; in other cases the drug is so completely destroyed in the body as to prevent any estimation of its presence in the urine, as, for example, in the drug digitalis; and again, in some instances, the methods of testing for the substance in the eliminative secretions cannot be relied upon. I trust at some future time to present original studies on this point, but at present I shall only gather together for your consideration the facts already scattered through some of the literature.

Of the mineral drugs which are rapidly absorbed and eliminated we find the following:

The iodide of potassium is absorbed and eliminated so rapidly when taken by the empty stomach, even in so small a dose as three grains, that it appears in the saliva and urine in from ten to twenty-five minutes, usually in about fifteen minutes. It does not tend to accumulate in the system to any great extent. Its rapidity of total

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elimination is apparently not so great as its speed of total absorption, for though it soon disappears from the stomach, it appears in the saliva for about thirty-six hours afterward. These results have been reached by a number of observers, but the figures given here are my own. Soullier asserts that the iodine appears in the urine and saliva in so short a time as five minutes, and this statement is endorsed by Desprez (*De l'élimination de l'iodure de potassium par les urines*, 1884). Doux states that thirteen minutes usually elapse before elimination begins.

Not only is the drug speedily found in the saliva, but the largest part of the dose taken escapes within twenty-four hours. About 80 per cent. escapes in this brief period; but, on the other hand, the drug remains in small amounts for much longer than this. Ehlers (*Annales de Dermatolog. et Syphilog.*, 1890) states that this residual quantity is slowly eliminated over a period of five days. John Marshall found that 265 grains a day could be recovered from the urine of a patient taking 360 grains a day. There are several reasons why this result is reached: First, the amount eliminated by the urine does not represent that eliminated by the saliva, and probably there is also an elimination by the bowel, so that an amount considerably over that found by Marshall really escapes from the body if the patient defecates or expectorates. On the other hand, one of the reasons why a certain portion remains uneliminated is that being eliminated in the saliva it is swallowed and reabsorbed; then, too, it is probable that some of the iodine unites with the albumen of the tissues, forming slowly soluble albuminoid compounds of iodine, and so this quantity is delayed in the body.

It is evident, therefore, that in the use of iodide of potassium we should give it freely and frequently at first until the residual amount has reached its limit, when smaller doses may be given and given less frequently for the purpose of maintaining the iodine influence; that is to say, the drug should be given up to the point of tolerance, whatever that may be, and then a smaller dose will be sufficient to maintain its influence by replacing the albuminoid compounds as they are slowly eliminated. On the other hand, if the iodide is being given for the purpose of eliminating some poison, as lead,

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for example, here the dose cannot be greatly decreased, because in addition to the ordinary quantity eliminated a proportion is passed out as a double soluble iodide of lead. This theoretical objection seems to find support in the fact that after the syphilographer reaches the full effect of the drug he often cuts the dose down to what he calls the "tonic dose," and so maintains the constant alterative effect without disordering the functions of the body. If he does not do this, the drug accumulates and causes chronic iodine cachexia, which is a state which it is important to avoid in a grave disease like syphilis, which depends for its relief so largely upon the development of great vitality in the patient.

It is interesting to note in this connection that when we give iodide of potassium the iodine unites with the sodium in the blood, and is so eliminated, whereas the potassium itself is more slowly eliminated; and as it has a depressant effect on the vital functions it cannot be ignored. This is illustrated in regard to another iodine compound by an experiment of Issersohn, who gave iodide of lithium hypodermatically and recovered all the iodine in the first twenty-four hours, but not all the lithium for forty hours. The facts in regard to the iodide of sodium are such as to strongly commend it as a substitute in medicine for the potassium salt. I have already shown in one paper, as have many others before me, that potassium is a powerful depressant, while sodium is not. Again, when iodide of potassium is taken internally it is decomposed, and iodide of sodium is formed. The sodium salt, therefore, possesses great advantages, as it contains practically as much iodine as the potassium salt.

Iodine itself is probably used less than the iodides, because it is irritant and more slowly absorbed, and seems to produce more irritation in its elimination than iodine derived from the salts named.

Bromide of potassium has been studied very thoroughly as to its absorption and elimination. It is absorbed rapidly, and exceedingly slowly eliminated. Thus, Rabuteau asserts that five minutes after it is taken it begins to be eliminated, and in ten minutes its presence is most manifest. Amory found one-half of the drug eliminated in twenty-four hours, and one-third in the next twenty-four hours; but the important fact for us to remember, from a thera-

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peutic point of view, is that the balance of this drug is perhaps more slowly eliminated than any of the common remedies, for Bill (*American Journal of the Medical Sciences*, July, 1868) found it in the urine two weeks after the drug had been stopped, and Rabuteau found it one month after. The same rule which was stated as governing the use of the iodides holds here, namely, that after the drug is once manifesting its full effect smaller doses will maintain its effects, and this is the method in which those neurologists who use it most generally employ it, namely, full doses for one week, and then small doses, only large enough to preserve the effects. Probably few general practitioners follow this custom.

It is manifest, therefore, from what I have said that the administration of either iodides or bromides in frequent small doses possesses no advantage, and is apt to disorder the digestion and overload the organism with the drug. They should be given twice or thrice a day in full dose rather than frequently in small doses.

The rapidity of absorption and elimination of mercury depends to a very great extent on the variety of it which is given. The drug in some forms is so soluble, in others so insoluble, that very great delay in its elimination must often ensue, because it is slowly absorbed. It will be futile in this brief paper to discuss the form in which mercury is absorbed. It is usually taught in France that the theory of Mialhe is correct: This is that the mercurial preparations are transformed in the stomach and intestine into the bichloride, which in turn unites with the sodium chloride in the blood and circulates as a double chloride of mercury and sodium. In Germany it is taught that it forms an albuminate of mercury and so circulates (Henoch's theory), or that it forms a chloro-albuminate (Voit's theory). All theories as to the form of its absorption are open to grave criticism. As to the elimination of mercury, it is known to escape by every avenue of exit from the body, the urine, feces, sweat, tears, milk, and saliva. After a single dose the drug begins to be eliminated in about two hours, according to Byasson, and is entirely gotten rid of in twenty-four hours. If, however, the doses are persisted in, it gradually accumulates in the body, and is so slowly eliminated as to remain for almost indefinite periods of time, and is found deposited in all the organs; in other words,

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the doses of mercury ordinarily given are always large enough to produce cumulative effects. Thus, while Balzer and Klumpke agree with Byasson as to the rapidity of elimination of a single dose, they find from an experimental study that the amount of mercury which can be eliminated by the kidneys for many weeks, when the body is saturated with the drug, is only one-sixteenth of a grain a day. It is evident, therefore, that after a full mercurial effect is produced it is well, as do most syphilographers, to decrease the dose of mercury and only give enough to maintain the effect. It is also evident that their plan of using iodide of potassium every now and again to aid in the elimination of the residual mercury is advisable.

Antipyrin is rapidly absorbed from the stomach in a space of from fifteen minutes to half an hour, and begins to appear in the urine at this time, but Reihlen asserts that its elimination continues for from thirty-three to fifty-six hours after the last dose. It therefore should not be given in too frequent doses. In regard to acetanilid we have the assertion of Kumagawa that it is absorbed in half an hour and eliminated completely in twenty-four hours, so that it is not as prolonged in its effects as is antipyrin.

Atropine and belladonna are, on the other hand, absorbed with extraordinary rapidity and equally rapidly eliminated in the urine. Harley asserts that elimination is complete in two hours. This drug may therefore be wisely given frequently. Aconite is also rapidly absorbed and destroyed by oxidation, so that its effects do not last for any length of time.

Arsenious acid is absorbed fairly rapidly, but eliminated very slowly indeed, chiefly by the kidneys and the sweat. It begins only after the lapse of fourteen hours, and continues for sixty hours, and it is thought by some that the development of an arsenical rash is an indication that elimination through the skin is beginning. This drug ought, therefore, to be given at long intervals rather than in many doses each day.

I have called attention to these facts in regard to the absorption and elimination of drugs because I do not think that enough attention is given to this important subject when drugs are administered.

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DISCUSSION.

DR. FRANK WOODBURY: Dr. Hare has called attention to a very important subject and one possessing clinical applications which are often not recognized. While it is true, however, that the rapidity of elimination of drugs is to be considered in administering them to patients, it does not follow necessarily that drugs which are slowly absorbed and are tardily excreted must always be given at correspondingly long intervals. For instance, taking the case of bromide of potassium, it is sometimes better to administer the drug in small doses at short intervals in order to obtain the full effects from the smallest amount. With regard to the advisability of substituting the sodium iodide for the potassium iodide, it may be said that this suggestion has already been acted upon to some extent. It is possible, however, that the very fact that the potassium salt is decomposed in the system may be an argument in favor of its greater therapeutic activity, owing to the action of the nascent iodine liberated by this decomposition previous to the formation of the sodium compound.

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SOME MOOTED POINTS IN THE PATHOLOGY OF APPENDICITIS, WITH SPECIAL REFERENCE TO THAT FORM KNOWN AS APPENDICITIS OBLITERANS.

By JOHN B. DEAVER, M.D.,

[Read April 7, 1897.]

Since the time it was determined that the great majority of inflammatory troubles in the right iliac fossa originated in the appendix there have been diverse opinions expressed in regard to the pathology of this affection. Especially has this been true with reference to that branch of pathology which investigates the cause of the pathological changes, viz., the etiology. The anatomical structure of the organ, together with its shape, differences of positions, and its general retrograde condition, have been almost universally accepted as the chief *predisposing* causes of this inflammatory trouble. But when we consider the *exciting* causes we find a great diversity of opinion.

Of the chief exciting factors the presence of a foreign body, such as a seed, cherry-pit, etc., was the one probably first advanced. Other writers claimed that the trouble was due entirely to micro-organisms; others, again, thought that fecal concretions played the most important part.

The idea that a foreign body must necessarily be present has given way before our more complete knowledge of the disease. The theories in regard to the micro-organismal invasion and the presence of fecal concretions have had their ups and downs, until at the present time there is no consensus of opinion in favor of either as a sole cause.

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I purpose in the paper here presented to show that both theories are tenable, in that both conditions are strong factors in the causation of appendicitis, although as a rule the formation of fecal concretion precedes the invasion of micro-organisms. I wish to show also the relation of these causes, both of which are known, by the course of the disease, and by the conditions present at the time of operation, to be active in the vast majority of cases.

The ideas advanced have been obtained from a study of over 1500 microscopical slides made at the German Hospital, where each case of appendicitis is systematically and thoroughly studied. A full and complete history of the patient's trouble is obtained. A description of the operation is recorded, special note being taken of the position of the appendix, the general direction which it holds, the presence or absence of pus, etc. The organ is photographed immediately after removal, and in many instances an x-ray photograph is also obtained. The appendices are then treated for microscopical work in the usual manner for section cutting. After the specimens have been thoroughly hardened they are cut into sections of one-half centimetre each, and the diameters of the outside and of the lumen, the appearance of the different coats, and the contents of the lumen are noted. Two or more of these portions are then cut into sections, stained and permanently mounted. The most interesting are then photomicrographed, and we are ready for a thorough study of the inflammatory trouble.

The few statistics presented have been taken from forty of the fifty cases which have been operated on at the German Hospital since January 1, 1897. These may vary somewhat from the statistics of a full year's work, but I consider them of more interest since they are the result of very recent investigations.

It is probable that every primary attack of appendicitis follows an invasion of micro-organisms. This invasion, on account of hyperæmia or deranged circulation of the organ, superinduced by kinks or twists in the mesentery of the appendix, by fatigue, traumatism, typhoid fever, influenza, etc., may take place, in a few cases, through the lymph channels. In a vastly greater number of cases, however, it occurs through an eroded mucous membrane. The erosion is caused by masses of fecal matter,

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rarely by a foreign body. Fecal matter is introduced into the lumen of the appendix by contractions of the cæcum. The expulsive force of the appendix is not sufficient to expel it, and hence it remains to irritate the mucous layer, at first merely by its presence. The slight muscular movements of the appendix tend to mould the mass into a round or oblong shape. This mass is augmented by the natural secretions of the mucous membrane of the appendix, and by further accessions of fecal matter from the cæcum. Gradually, the concretion increases in size until it irritates by causing pressure against the walls of the organ. This is followed by a decided erosion of the mucous membrane, and this by an invasion of the micro-organisms which are always present in the fecal matter. They proliferate, and the inflammatory troubles then begin. In a few cases the increased secretion of the mucous layer may cause partial liquefaction of the fecal concretion, which may be expelled. In the majority of cases, however, the concretion remains in the lumen, where it is bound to act as an exciting cause of further inflammatory trouble.

Following the invasion of the micro-organisms we find the general conditions common to any inflammation of the mucous membrane. It must be borne in mind that this invasion takes place only at the site of the dissolution of the mucous membrane, although the micro-organisms are liable to spread rapidly through all the walls of the organ. With the exception of the point of invasion the mucous membrane may be, and often is, absolutely normal and healthy; at other times it shows the effect of inflammation which has extended by continuity of structure. Almost immediately after the invasion there is an attempt at reconstruction on the part of nature. A round-celled infiltration takes place, with at times a deposition of fibrous connective tissue. Unless interrupted in its course by nature or the surgeon, the process will continue not only through the walls of the organ but to the surrounding structures, giving rise to that stage of the appendiceal inflammation which is known as para-appendicitis. Here we have to deal with troubles which are known to all operators who have seen many cases that have been allowed to take their course. In the first place there is a bank of lymph thrown out for the purpose

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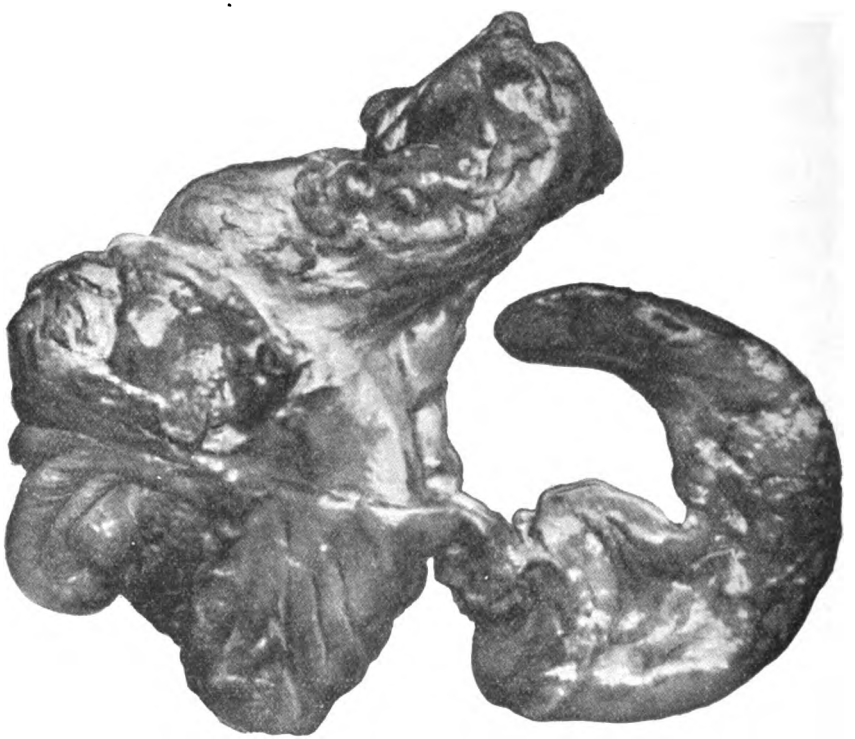
of protecting the general peritoneal cavity from infection. In case of an abscess-formation this wall is of the greatest importance in saving the patient from a purulent peritonitis. That an abscess may cause much trouble *per se* if allowed to remain long in the right iliac fossa is beyond dispute. I have seen several cases where the pus burrowed toward the liver, under the limiting membrane, along the iliac vessels into the thigh, etc. These cause at times a

FIG. 1.



Separation of base of appendix from its origin from cæcum, thus forcing the fecal contents of the latter into the peritoneal cavity.

condition beyond our power to control. I remember one case in which there was present a large quantity of foul pus which had burrowed under the limiting wall, and formed pockets which could be found only by the most thorough search. Time and again I thought that I had the cavity perfectly clean, but would be con-

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fronted by another welling up of the purulent matter from some unknown site. After general septicæmia had ended the patient's life the post-mortem revealed many other pockets, which had not been reached, hidden beyond the limiting membrane.

The relation of the appendix to this limiting membrane plays a most important part in the prognosis of appendicitis, and on one point I wish to lay special stress. *In a vast majority of cases the limiting membrane does not include or surround the entire organ.* The base, as a rule, is the part left exposed, and I have seen some few cases where a perforation had taken place through this portion of the appendix, with a resulting general purulent peritonitis. The abscess-cavity at the same time remained intact, and but little trouble was found in dealing with it. Since the base of the organ is without the limiting membrane it does not enter into the formation of the wall, nor is it protected by the wall, and therefore any pathological change which may take place in that part will necessarily affect the peritoneum in contact with it and, naturally, the general peritoneal cavity. In most cases this exposed condition of the base does not lead to any untoward effects, but there are other cases in which perforation has taken place with fatal results. (Fig. 1.) Why nature allows this condition of affairs to exist no one can say, but that it does exist cannot be denied. The body of the appendix is generally

FIG. 2

a constituent part of the limiting membrane, and is thus surrounded by a mass of exudate which prevents it from perforating or causing much trouble. The tip may be within the wall—that is, in the abscess-cavity; or it may be a part of the wall or without the wall —that is, in the general peritoneal cavity. In these latter instances perforation may take place with results similar to those found in perforation at the base—that is, general purulent peritonitis. Perforation does take place from the extreme tip of the organ at times,

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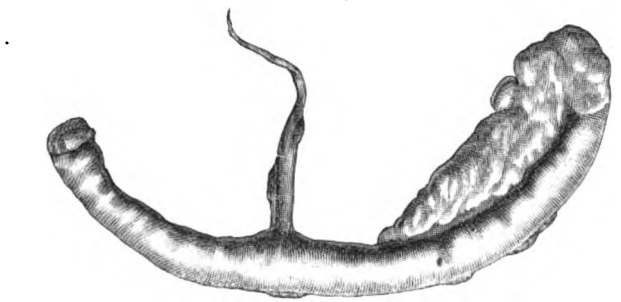
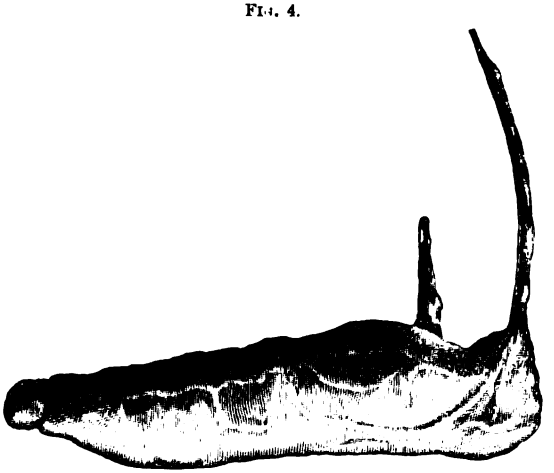
as is well shown in Fig. 2; but it is generally in those cases which have gone on to a chronic condition, with occlusion of a portion of the lumen of the appendix. These cases I will discuss later.

FIG. 3.



In those cases presenting no pus-formation, but appendiceal peritonitis, we will find adhesions from any portion of the length of the appendix to some of the surrounding structures or to other

FIG. 4.



portions of the organ. These, if allowed to remain in place, play an important part in causing kinks, twists, etc., in the appendix. It is generally known that the adhesions are always more numer-

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ous and of greater pathological significance in those cases that have been repeatedly visited by the dread inflammation. Some of the adhesions that have been formed during the inflammatory condition of the organ are well shown in Figs. 3 and 4. These might well be considered as a fruitful factor in the form of ileus which is caused by a band.

In those cases also where we do not find pus-formation we may meet with one or more of the several following conditions: The condition of the lumen after an attack of appendicitis is such that it is an almost constant cause of further attacks. After the round-celled infiltration has taken place we find contraction of the tissue which nature has thrown out to repair the damage. This will cause a constriction of the lumen at that point, with, generally, occlusion of the entire calibre. Out of the forty cases that have been operated on at the German Hospital since the first of the year, twenty-five of them were partially occluded—that is, there was a complete obliteration at one or more points in the length of the lumen. This fact alone accounts for many secondary attacks of inflammation and of much suffering in some cases where there is no succeeding inflammatory trouble. As stated, we find the mucous membrane healthy in many parts of the lumen. Should this be the condition of the membrane to the distal side of the obstruction in the lumen, we shall naturally have the secretions and débris thrown out by the mucous layer confined. As the amount increases nature endeavors to expel it. This can be accomplished only by forcing the accumulated material through the obstruction or through the walls of the organ, which, by ulceration, have been weakened and distended. If through the obstruction, there is a tearing asunder of the weakest portion of the constriction —that is, the walls of the appendix are forced apart and the lumen reopened by breaking down the round-celled infiltration, which has completed the occlusion at that point. This is the cause of much suffering on the part of the patient, and accounts for many attacks of severe, excruciating pain with which the possessor of a chronic appendicitis is very often familiar. The pain is caused not by inflammation, to which it has been generally ascribed, but by the pressure on the delicate nerve-endings with which the appendix is

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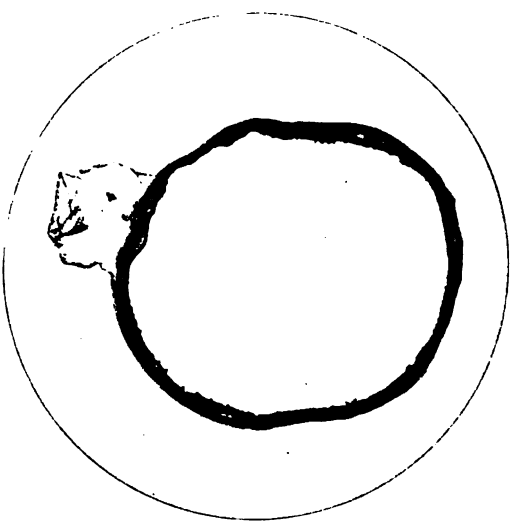
well supplied. In these cases there is absolutely no inflammation present at the time of the pain.

This expulsion of contained material may take place time and again, until the barrier has become strong enough to withstand all efforts nature may make to force it open. We then find a condition which will be followed by ballooning of the distal portion of the organ, forming what has been termed a cystic appendix. As long as the walls are strong enough to stand the pressure we will have but few symptoms, except the pain caused by pressure on the nerve-endings. The walls finally be-

FIG. 5.



come so thin that they rupture, and we then have a peritonitis, abscess, or what not, to deal with. Fig. 5 well shows this condition of ballooning. The illustration is a photomicrograph of a section. While these photomicrographs may not show clearly all the microscopical changes in the organ as a result of inflammation, yet they will answer the purpose of illustration better than any other means I know.

Of more significance than the secretions and débris of the mucous membrane are the fecal concretions that are so often walled

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FIG. 6.

FIG. 7.

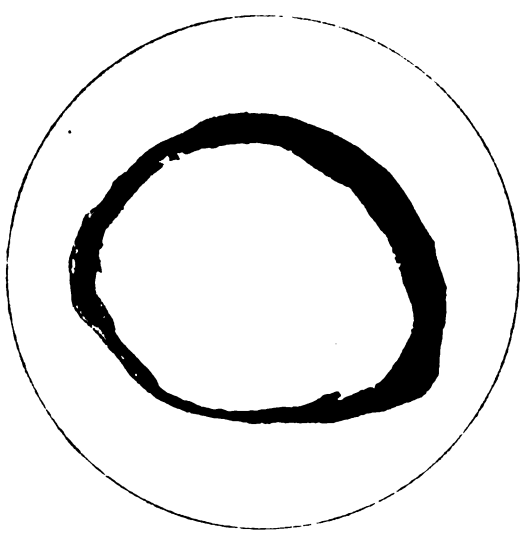

Fig. 7 is a photomicrograph of a section from which the fecal concretion has been removed. It shows dilatation of the lumen and erosion of the mucous coats.

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off in the lumen of the appendix. Of the forty cases, twenty contained fecal concretions. Some of these were confined to the distal side of an obstruction, and, if allowed to take their course, could give but one result—rupture of the organ, with expulsion of the fecal matter into the abdominal cavity. The concretion being too large and too consistent to be forced through the obstruction, must be liberated through the walls of the organ unless the latter be removed from the body. Figs. 6 and 7 show a concretion in section. Of the forty cases, seven had ruptured. Foreign bodies sometimes play a *rôle* in this connection, as Fig. 8 clearly shows. The

FIG. 8.

illustration is from a blue-print of an x-ray photograph. Near the tip of the organ will be seen a dark spot, which investigation proved to have been caused by a small particle of lead. How it got there is a nice question to decide. It was probably a shot taken into the alimentary tract while the patient was eating game. The illustration does not show it clearly, but just to the proximal side of the piece of lead was a constriction. But one result could have occurred in this instance, had the appendix been allowed to remain in the abdominal cavity, viz., rupture at or near the extreme tip.

Partial occlusions are often formed in different portions of the same lumen, and several may be found at different points along its length. There is always increased suffering in these cases on account of nature's efforts to expel any contained material. When these occlusions are so numerous that they gradually work together and close the entire lumen we have a condition that has been described by many writers as *appendicitis obliterans*. Examination

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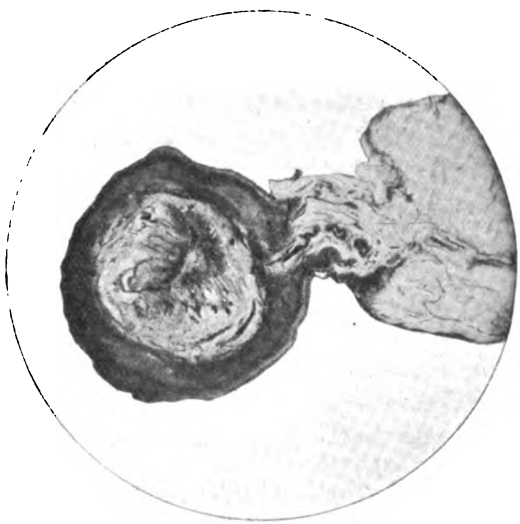
of appendices removed shows that some of these cases are the result of occlusion that begins at the tip and gradually works its way to the base, pushing before it any material that may be found in the lumen. Although the result of this process has been termed *appendicitis obliterans*, that term is a misnomer. There is no obliteration of the appendix excepting that small amount that is brought about by contraction and atrophy of the unused organ. What does take place is entire obliteration of the lumen of the organ, but not of the organ itself. But one of the fifty cases operated on this

FIG. 9.



year shows this condition, although I had several of them prior to January 1st. The history of one case from last year may be of interest. Dr. B., aged forty years, had had one attack of acute appendicitis, from which he apparently recovered with little trouble. He noticed, however, that the pain persisted even after he was able to leave his room and attend to his practice. The pain was paroxysmal, excruciating at times, often remittent, but never entirely absent. The appendix was removed, the patient made a good recovery, and has been free from pain since. The pathological examination of the organ showed that the lumen was entirely oc-

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cluded. There was no evidence of active inflammation. The site of the lumen was replaced by a mass of round-celled infiltration and fibrous connective tissue. Fig. 9 is a photomicrograph of one of the sections, and is a splendid illustration of the condition of the entire lumen. I believe that the pain from which this patient suffered was due to pinching of the small nerve-endings in the appendix, and not to any inflammatory trouble present at the time. I am not sure that these cases can be diagnosticated as such before the operation, although I think there is less tenderness on pressure; that there must be more decided pressure to elicit marked tenderness, and that the patient suffers more constantly than is usually the case.

There is but one other point to which I wish to call your attention, and that is the presence of a circumscribed collection of pus in the walls of the appendix. Three of the forty cases studied showed this condition. It is scarcely necessary to state that recovery from such a condition could be accomplished only by the removal of the organ.

A study of these changes which are wrought in an appendix that has been the seat of inflammation convinces me more decidedly than ever that the sooner such appendix has been removed from the abdominal cavity the better it will be for the patient. The pathology is decidedly in favor of removal of the organ, for most cases show a condition that must result in serious trouble to the patient were operation declined.

I would like to add that no two appendices show exactly the same pathological changes, and that we but seldom find the many sections of any given organ agreeing exactly with each other.

To summarize the examinations of the forty cases, I would state that twenty of them contained a fecal concretion; twenty-five were partially occluded—that is, had an incomplete obstruction at one or more points in the length of the lumen; one was entirely occluded—that is, took that form generally described as appendicitis obliterans; seven were ruptured; three contained abscess in the walls; one contained a foreign body (a piece of lead).

Serum Diagnosis.—The medical profession has been startled with a new blood diagnosis for enteric fever, and the principles

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laid down by these discoveries will doubtless lead to wider observations for diagnostic purposes. The experiments of Durham, of London, "On Special Action of Serum on Immunized Animals" (read before the Royal Medical Society of London, January, 1896) show conclusively that special micro-organisms, such as cholera vibrios, colon bacilli, and typhoid bacilli, produce special forms of immunity in animals by injection of living or dead cultures. Such immune serum, when mixed with pure cultures of the same micro-organism as was used to produce immunity, will show the following reaction: The micro-organisms will lose their power of motility, if motile, and produce clump formations. Durham's experiments showed that serum immunized by colon bacilli, when inoculated by active culture of the same species, exhibits reactions of stoppage of motility, clump formation, and the serum remains clear after twenty-four hours' incubation; control-tests made with normal serum shows no loss of motility, no clump formation, and serum becomes uniformly cloudy. The colon bacillus was also tested with serum immunized by typhoid and cholera, but showed no loss of motility, no clump formation, and the serum became uniformly cloudy.

The infections of appendicitis are in a very large proportion due to the varieties of colon bacilli, sometimes mixed with staphylococcus, streptococcus, and bacillus pyocyaneus. With these facts in mind we have taken the blood from three cases of acute appendicitis with abscess-formation, and have tested the same by the method employed by Johnson in the Widal test. Control-tests were also made with normal blood. It was noted that in each the loss of mobility was apparent and that there was slight clump formation. The cases when operated on showed abscess-formation containing the colon bacillus in almost pure culture.

Observations in this line are too recent to warrant lengthy records, but I wish to inform the Fellows of the College that special study of the infections in appendicitis is being made, the results of which will be made public. Serum diagnosis may be of value in differentiating typhoid fever from appendicitis, vague abscess-formation, symptoms produced by severe catarrhal conditions, and appendicitis obliterans.

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I recently operated upon a child, thirteen years old, in whom the diagnosis of pus was made chiefly from the great degree of tenderness present and in which this test had been made, but of which I was not aware. The operation revealed pus. The test showed the colon bacillus immobile. While I believe this test is a valuable one, yet I would not be willing, in the majority of cases, to defer operation until the test be made if it would entail much delay, believing, as I do, that delay is too dangerous.

In conclusion, I wish to tender my thanks and credit to the resident staff of the German Hospital, particularly Mr. M. J. Wilbert, Drs. C. Frese, Kalteyer, and Blair, for the work which has rendered this paper possible.

DISCUSSION.

DR. W. JOSEPH HEARN: I should like to ask Dr. Deaver if he has found that dietary indiscretions are the rule, as in my experience almost all cases have been preceded by some such indiscretion. I recently had a case of a child five years of age in whom the lumen of the appendix was distended, and in which fecal concretions existed and must have been there for some time. Upon inquiring about the diet I found that the child had been eating English plum-pudding for dinner and probably some for supper. Changes in the appendix generally begin in the mucous membrane, although sometimes only a part of this structure is involved.

DR. JOSEPH MCFARLAND: To reduce the pathology of appendicitis down to "fecal concretions" and the "colon bacillus" is to limit the subject very much. I cannot speak from an examination of 1500 cases, as Dr. Deaver can, and that number rather appalls me, but I would like to call attention to the fact that fecal concretions in the appendix are by no means uncommon in perfectly normal individuals, and are found in many cases at autopsy. The colon bacillus is invariably present in the intestines. These two factors can scarcely be regarded themselves as sufficient cause for producing appendicitis. The colon bacillus in different portions of the intestine has a very different degree of virulence. In the jejunum the virulence of the colon bacillus is greater than it is toward the end of the ileum. Errors of diet, no doubt, have something to do with appendicitis, and we can conceive of catarrhal conditions of the intestine depending upon indigestion bringing an unusually virulent form of the colon bacillus into the

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ileum. Some time ago the tendency was to attribute appendicitis to disease of the bloodvessels of the appendix, a slightly diseased condition of the walls of the vessels producing thrombosis, obstruction of circulation and softening of the coats of the appendix. With such necrotic conditions present, the slightest contraction of the cæcum could cause fecal matter to flow out into the abdominal cavity. I remember a case in which the tip of the appendix seemed to have softened and could be picked off with the forceps. By some it has been thought that disease of the appendix results from diseases of the nerves supplying it, and especially of the vasomotor nerves. Van Cott, of Brooklyn, has made a special study of this subject. The vital resistance of the individual may have something to do with appendicitis, especially that phase of it in which the colon bacillus is concerned. Tuberculosis is known to be a not uncommon cause of appendiceal ulcers. I think it would be wiser to say that all the causes that have been suggested are at times operative in the production of the disease.

DR. CHARLES K. MILLS: I am interested in this subject because of the peculiarities of certain cases that I have seen. Whenever a disease is thoroughly investigated and so thoroughly exploited that it becomes well known to the profession and the public, we have many cases with similar symptoms in our nervous practice. I have had some very striking instances of this fact, and only to-day I saw a patient whom I saw three or four years ago, and who was then supposed to be suffering from appendicitis. A consultation was held, and he was very nearly operated upon; but he recovered shortly after the consultation, and since that time he has had several attacks of other diseases, such as local affections of the sexual organs and of the heart. This kind of appendicitis—which might perhaps be called "cerebral appendicitis"(?)—is beginning to be quite common, and a most thorough examination should be made in each case. The patients become very familiar with the symptoms, and can point out the exact location of the disease, in addition to explaining some of its special phenomena.

DR. DEAVER: All of the cases to which I have referred have been studied from the standpoint of the pathological examination, and all my results have been obtained from the operating-room and the pathological laboratory.

So far as Dr. Hearn's question as to the frequency of dietary indiscretions is concerned, I agree with him. As to the question of fecal concretions, there is no doubt in my mind personally that these play an important part, and I believe in connection with these that the micro-organisms are very important. I have frequently seen feces in the appendix which I believe have excited the attack, as I do not think the micro-organisms themselves always produce it. I believe that when intestinal fermentation begins the colon bacillus is no longer normal, but becomes pathological.

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A CASE OF SARCOMA OF THE LUNG, WITH SYMPTOMS OF ADDISON'S DISEASE FROM INVOLVEMENT OF THE SUPRA-RENAL CAPSULES.

By FREDERICK A. PACKARD, M.D.,

AND

J. DUTTON STEELE, M.D.

[Read April 7, 1897.]

CLINICAL REPORT BY DR. PACKARD.

THE case herewith reported is placed on record partly because of the rather infrequent occurrence of such massive malignant disease of the lung, partly because of the rarity of bronzing of the skin from carcinomatous and sarcomatous involvement of the suprarenal capsules. During life the diagnosis was made of primary malignant neoplasm of the lung, with secondary deposit in and destruction of the adrenals, and it was only after careful consideration of the pathological conditions found at autopsy and a histological study that the word "primary" was omitted from our title.

The patient was a man, aged thirty-three years, who was admitted to the Philadelphia Hospital, July 1, 1896, suffering from cough and hæmoptysis, which dated from December, 1895. He was a native of Holland, a day-laborer by occupation.

When first seen, in October, 1896, when I went on duty at the hospital, I was much impressed by his peculiar facies. His face expressed much suffering, his skin was of a peculiar sepia color, his mucous membranes were exceedingly pale, and his scleræ of a remarkably blue color.

The important points in regard to his past history and that of his present

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trouble can be given in a few words. His father died at the age of fifty-three years of "dropsy;" his mother, three brothers, and a sister are alive and well. All of his family are said to be of a dark color. He had the ordinary diseases of childhood, but was never seriously ill until the onset of his present trouble, and always considered himself a healthy man. He never used alcohol immoderately, never contracted venereal disease, and had received no injury.

His present illness dates from December 23, 1895, although he had had a hacking cough for some time before. On the date mentioned it was noticed by his landlady that there was some blood in his expectoration, although he himself had not noticed it at this or at any prior time. Soon after this he noticed pain in his right side, a new symptom in his trouble. These symptoms—cough, hæmoptysis, and pain in the right side of the chest—had continued with increasing severity until the time of examination.

In February, 1896, he began to have severe pain in the right leg, especially in the knee. This pain continued with great intensity until his death.

Careful and repeated questioning failed to elicit any history of increasing darkness of skin, and the patient frequently declared that his skin was always dark.

Early in October the following notes of his condition were made: "He is thin to emaciation. The attitude when sitting on a chair is constrained, the weight being thrown to the left side, the hands being held on the arms of the chair in order to overcome the jar produced by coughing. When in bed the decubitus is on the right side, with the right thigh and leg strongly flexed. The slightest movement of the trunk or right leg causes excruciating pain, so that without an anæsthetic thorough examination of the right hip is impossible. The breathing is hurried, shallow, and frequently interrupted by a smothered cough. The radial pulses are equal, rapid, and very compressible.

"The face is drawn and sad, the skin of the face light olive or sepia in hue, the upper eyelids very dark. The mucous membrane of the mouth is very pallid and shows no area of pigmentation. The scleræ are very blue, the pupils equal and natural. The right side of the neck is decidedly fuller than the left, from the presence of two or more enlarged supra-clavicular glands.

"The skin of the trunk is very dark. On the front of the chest on the right side are two darker areas, an inch and a half square, said to be the result of two blisters that were applied six weeks ago. The pigmentation in these areas is very decided, being not at all produced by the hyperæmia and pinkish discoloration ordinarily seen after the use of blisters, but of a dark-brown color. Over the right half of the thorax at the base there is a larger but rather less deeply pigmented square area that marks the site of a mustard plaster applied one or two weeks ago. The areolæ of the nip-

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ples are very dark, and there is a slight increase of pigmentation in the axillæ.

"The thorax is long, the downward curve of the ribs being very marked, the costo-sternal angle very acute. On both sides the clavicles stand out prominently from sinking of the upper portion of the chest. The right side moves but little during respiration; the left shows rather exaggerated respiratory excursion. The heart is in the normal position, the area of cardiac dulness is unaltered from the normal, so far as can be determined, and the heart-sounds are clear and free from murmur. Over the right chest anteriorly the percussion note is absolutely flat, with great increase of resistance to the percussed finger. This flatness and increase in resistance is possibly more marked above the fourth rib than below that point. The dividing lines between the toneless note over the lung and that due to the heart and liver cannot be determined, although a slight difference in the pitch at the upper border of the seventh rib on the right perpendicular line would seem to indicate the upper border of the hepatic area. The liver dulness extends downward to the costal margin. The percussion note over the left lung anteriorly is exaggerated except immediately below the left clavicle, where it is impaired. The area of splenic dulness is normal. Over the right side anteriorly there is absolute silence on auscultation save in the infra-clavicular region, where there is distinct cavernous breathing over a very small area. Vocal resonance and tactile fremitus are absent, except over the area of cavernous breathing, where there is poorly developed bronchophony.

"Posteriorly the examination shows a decided deviation of the thoracic spine to the left, and marked pigmentation over the sacrum. The right lung posteriorly and in the axillary region is dull, almost to flatness, with great increase of resistance, and showing absence of breath-sounds except near the root, where there is distinct bronchial breathing with numerous moist râles. Over the left lung there is exaggerated resonance, with puerile breathing.

"The abdomen is scaphoid, but is otherwise negative, there being no marked increase of pigment beyond that of the whole surface of the body. No tumor-mass can be felt. The external genitals are very dark. Examination of the right knee shows merely slight fulness on either side of the patellar tendon, there being no floating of the patella, and, so far as could be determined, no abnormal range of movement. The right leg showed no other abnormality, but careful examination of the hip could not be made without an anæsthetic, owing to the great pain caused by the slightest manipulation."

The urine showed no abnormality save for a high specific gravity—1025. Examination of the eye-grounds was negative except for a high degree of choroidal pigmentation, possibly not excessive for a man with normally rather dark coloring and black hair.

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Laryngeal examination was entirely negative.

Examination of the blood showed simple anæmia with equal moderate reduction of red cells and hæmoglobin, and no leucocytosis.

The sputum was somewhat peculiar in that it was tough, apt to be expectorated in clumps, and was of a peculiarly white color. It was on one or two occasions slightly streaked with blood, but at no time had the currant-jelly appearance or grass-green color. No fragments of growth could be found in it, the only peculiar fact noted being that there was much amorphous, granular material and detritus in addition to a small number of pus-corpuscles. (The examination of sections of the lung shows clearly why tumor-tissue could not be recognized in the broken-down material that probably composed the greater part of the expectoration.) Tubercle bacilli were never found in repeated examinations.

During the entire time of his hospital life the patient had a very irregular temperature, with constant evening exacerbations of from 1.5° to 2° F. It attained 102° in the evening on a few occasions, but the average evening temperature was 100⅘° to 101⅘° F.; that of the morning from 97⅘° to 99⅘° F. The pulse was uniformly rapid, being constantly above 105 to the minute.

The appetite was poor, the bowels usually regular, but at times a little too frequently moved.

Some sweating at night was present at times, but it was not excessive, and was not out of proportion to his debility.

The conditions noted above persisted until the time of his death, with the exception of the physical signs over the right lung. At each examination after that first made there was constantly absolute dulness, with complete silence over the whole right lung. The abnormal pigmentation noted in areas on the chest slowly but continuously became darker until death. About a week before death the feet and legs became swollen to a marked degree, the œdema being soft and deeply pitting. For the last twenty-four hours of his life the breathing was of the Cheyne-Stokes type. Immediately before death internal strabismus was noted, but of which eye is not stated in the notes.

Death occurred, apparently from asthenia, on November 13, 1896.

The diagnosis made during life was primary tumor of the right lung, with secondary involvement of the adrenals. The only other condition seriously considered was inflammatory thickening of the pleura from tuberculous infection, with concomitant fibro-caseous change in the adrenals. The negative result of examination of the sputum, it was thought, might have resulted from loss of function of the right lung from compression by the thickened pleura and consequent absence of expectoration from the diseased lung; but further observation demonstrated that the amount of sputum was

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too great to be accounted for by the slight physical signs on the left side of the thorax. The constant absence of tubercle bacilli from the expectoration, in spite of repeated careful examinations, allowed but three lesions to be considered as possible causes for the physical signs present on the right side of the chest—primary endothelioma of the pleura, tumor of the lung itself, and non-tuberculous thickening of the pleura. The latter was excluded by absence of retraction of the right half of the thorax, by the previous history of the case and the course of the disease, by the presence of an enlarged lymph-node above the right clavicle, and by the involvement of the adrenals. The history of quite early hæmoptysis pointed to tumor of the pulmonary parenchyma rather than to endothelioma of the pleura.

As has been said above, careful examination of the right hip and thigh was impracticable without anæsthesia, on account of pain, and the condition of the patient did not warrant either causing pain or administering an anæsthetic. Owing to the apparently normal condition of the bones on superficial and hasty examination, the possible bony origin of sarcoma, with secondary pulmonary and suprarenal involvement, was not considered in making a clinical diagnosis. It might be added that after the patient's death, as his body was in the process of being turned on the back, the right femur suddenly snapped at its upper portion. It is, therefore, on the whole, well that thorough manipulation and handling of the thigh and hip for diagnostic purposes was not attempted during life.

Pathological Report by Dr. Steele.

Autopsy held at the Philadelphia Hospital seven hours after death.

There is a considerable increase of pigmentation on the face, hands, and genitalia, though not marked upon the hands. The scrotum is of a light sepia color. There is no discoloration of the mucous membranes. Dark hair and dark eyes. There is a scar behind the great trochanter of the femur, which is sharply and distinctly pigmented and is of a dirty-brown color.

Abdominal cavity. There is a hard mass in the head of the pancreas, about the size of an English walnut, which, however, is not adherent to any of the surrounding structures. The mesenteric glands are slightly enlarged, but do not seem to be affected by the new growth. In other

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respects the relations of the abdominal cavity are normal. The liver extends to the fourth interspace above, 2.5 cm. below the costal margin in the midclavicular line and 9.5 cm. in the median line.

Heart. Relaxed. The ventricles are distended by hard, white coagula. The myocardium is pale and somewhat fatty. The valves and endocardium are normal.

Pericardium. Normal.

Pleuræ. The two layers are tightly adherent over the whole of the upper and middle lobes of the right lung. When traction is made upon the adhesions the visceral layer of the pleura separates from the lung over an area of degeneration in the middle lobe. In one place the cavity formed by the softening has ruptured into the pleural sac. The degeneration is evidently due to a new growth. The pleural sac upon this side contains 300 c.c. of a blood-stained fluid, in which are floating masses of degenerated tumor-tissue that somewhat resemble blood-clots. The left pleura is free from disease.

Lungs. The right lung upon examination is seen to be extensively infiltrated by the tumor-mass. The entire middle lobe and the lower half of the upper lobe are degenerated and cystic. The pleura is thickened over the affected areas and studded with hard, white nodules. Similar nodules are seen in the lung-tissue around the edges of the degenerated areas. The upper part of the lower lobe is somewhat infiltrated and is exceedingly congested throughout.

The left lung is normal. The bronchial lymphatic glands at the root of the right lung are much infiltrated.

Thyroid gland. Normal.

Supra-clavicular lymph-glands are enlarged, but do not seem to be involved by the new growth.

Spleen. Measures 11 x 12.5 x 2.5 cm. The organ is softer than normal. The pulp is semi-fluid and easily removed. There is a hard, white nodule about the centre of the organ. The centre of the nodule is slightly hemorrhagic.

Suprarenal capsules are both much enlarged, the right especially so. Both capsules are studded by dense, white nodules that in some places are commencing to soften in the centre. They vary in size from 5 to 10 mm. in diameter. There is an especially large nodule at the apex of the right capsule that appears to be hemorrhagic. To the naked eye there does not seem to be any remains of the normal tissue of the capsules.

Kidneys are normal in size. The capsules strip readily. The pyramids and medullary rays are congested. In one of the central pyramids in the left kidney is a hard, white nodule measuring 3 mm. in diameter. The cortex on both sides is of the normal width and presents nothing of interest. Ureters and bladder are normal.

Pancreas. Thickly studded with nodules, especially at the head. These

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are hard and white, and several show areas of softening in the centre. The common bile-duct is surrounded by new growth. This apparently compresses it, but does not infiltrate its wall.

Semilunar ganglia. Of usual size and appearance; not involved by the tumor.

Stomach and intestines are normal.

Liver. Uniformly and deeply congested. There are several white nodules upon the upper peritoneal surface of the right lobe that average 8 mm. in diameter. There are a few nodules scattered through the substance of the same lobe. There are irregular areas of a yellow color, evidently of fatty change, scattered through the liver. The gall-bladder is distended by viscid bile and contains two semi-inspissated masses, which are dark-green in color and easily broken down. The common and cystic ducts are distended, but not markedly dilated. They average 3 mm. in diameter.

Skeleton. In the substance of the skull, in the parietal bone of the left side, is a round nodule, yellow in color and more transparent than the rest of the calvarium. On section this is found to lie in diploë, is softened in the centre, and resembles a new growth. It is 1 cm. in diameter. The external table is pressed outward over this area.

The shaft of the femur on the left side, just below the anatomical neck, is much degenerated and breaks upon examination. The cause of the softening is evidently a focus of the tumor tissue that is seen elsewhere in the body. The whole shaft of the bone for 8 cm. below the anatomical neck is involved. The epiphysis is not affected. The growth shows much degeneration, and the softened material has formed a sac about the affected bone.

Brain. Membranes normal. There is a recent apoplexy in the left crus cerebri that has broken into the fourth ventricle. The clot is red and soft and perfectly homogeneous, and does not suggest a neoplasm. It is limited to the fourth ventricle and the crus.

Microscopic examination. A portion of the femur was decalcified, and the sections stained by hæmatoxylin and eosin. The tissue is in such an advanced stage of degeneration that it is the exception to find an area in which the nuclei take the stain. There is considerable osteitis and resorption of bone, and the only traces of the original structure of the part are scattered areas of bone. The sections contain much connective tissue, which appears to represent the periosteum. This tissue is hyperplastic, as shown by the number of round-cells that it contains. In some areas there are alveoli that are packed by cells of a great variety of shapes. Some are large, round cells, with vesicular nuclei; others are spindle-shaped, with oval nuclei; others small and lymphoid in character. An occasional giant-cell can be found. In many places the nuclei have ceased to stain. The cells are degenerated, and are rounded and indefinite in outline. In many fields nothing can be seen but granular débris. The arterioles of the part show some thickening of the intima.

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No sections were cut from the growth in the skull. Sections taken from the thickened visceral pleura show much round-celled infiltration and hyperplasia of the connective tissue. In places the collections of round-cells are so considerable as to suggest sarcomatous tissue. The arterioles are thickened and surrounded by bands of connective tissue, but the areas of greatest inflammation lie around the lymph-channels. These vessels are much dilated, their walls are thickened, and they are surrounded by much round-celled infiltration. Their endothelial lining is thickened, and the lumen is packed by desquamated cells, between which is a considerable amount of pigment. The endothelial cells are seen only in the lumen of the channels, and have not infiltrated the tissues. In nest-like spaces in the proliferating connective tissue are collections of polymorphous cells similar in the three main types of those of the growth of the femur. Giant-cells are rather more numerous. There is much degeneration of the nuclei of the polymorphous cells. Some show a condition of karyorhexis with fragmentation of the chromatin; in others the nuclei are vacuolated, and in others there is hyperchromatosis, with lumping of the chromatin.

The nodules in the pleura and lung are found to consist entirely of cells of the most varied shapes, but which follow in general the three main types that are found in the other organs. There are also a few giant-cells, perhaps three or four in each field of the microscope. The lymphatics are somewhat dilated and contain pigment, but desquamation of the epithelium is not a prominent feature, though present in some places.

We have considered the significance of the dilatation of the lymph-channels and the desquamation of the endothelium found within them, and think that the condition is not one of new growth within the vessels, but a lymphangitis, probably caused by dilatation of the network of the lymph-vessels of the visceral pleura, produced by obstruction to the lymph-stream by the new growth. In support of this view is the fact that the evidences of inflammation of the pleura are much more marked around the lymph-radicals than around the smaller branches of the pulmonary artery.

The pancreas shows many nodules, consisting of the polymorphous cells described in the lung and femur. The degenerative changes in the chromatin are not as advanced as in the places already described. Here, also, giant-cells are found in moderate numbers.

The small nodules in the liver consist of collections of cells similar to those described. Giant-cells are present.

In the right suprarenal capsule the tubules of the cortex show much degeneration. Many of the nuclei are fragmented and the cells are desquamated and granular. The connective tissue of the gland is hyperplastic and surrounds the tubules with dense bands of fibrous tissue. The nodules, described as softened and hemorrhagic, are found to be a focus of the tumor growth, similar to those described elsewhere. Into the mass there has been a profuse hemorrhage that has pushed aside the cells in a remarkable

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manner. There is very little fibrin present, and the red cells retain their outline unchanged. We consider, therefore, that the hemorrhage occurred but a very short time before death.

In the left capsule the cells of the gland are somewhat degenerated, and there is a slight hyperplasia of the fibrous tissue, but the changes are not as advanced as on the right side. The nodules scattered through both organs are found to be foci of sarcomatous cells, as described in the other organs. We, however, estimated that about one-quarter of each gland is unaffected by the tumor. The semilunar ganglia were not involved in the growth, and on microscopic examination show nothing abnormal.

The skin shows many pigment granules that lie in and between the cells of the corium, but are very little if at all in excess of those found in the normal skin. The pathological diagnosis seems to us to be clearly that of a giant-cell sarcoma of the mixed type. The question of the primary seat of the growth has been most perplexing. The fact that but one lung is affected would suggest that the process might have originated in the lung; but we have concluded that it was primary in the femur for the following reasons:

1. It is a mixed sarcoma. The tumors of this class arising from the periosteum are usually of this type, while those originating in the lung are oftener of the small round-cell variety.

2. Giant-cells are present in all of the sections. While these cells are not exclusively confined to sarcomata of bone, they are much more common in this locality.

3. The advanced condition of degeneration in the femur suggests that the tumor had been growing there for a longer time than in the lung, for the reason that such a condition would cause more rapid breaking-down in the softer tissues of the lung.

The sequence of events seems to us to be probably as follows:

1. Primary involvement of the periosteum of the femur.

2. Secondary growth in the lung, with extensive degeneration.

3. Metastases through the degenerated efferent pulmonary vessels to the left heart, and through the arterial circulation to the various organs.

The cerebral hemorrhage, from its small extent and from the evident freshness of the coagulum, seems to us to have occurred in the agonic period.

The histological portion of this examination is from the Pepper Laboratory of Clinical Medicine.

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THE HYSTERICAL NEUROSES OF THE SKIN.

By ARTHUR VAN HARLINGEN, M.D.

[Read April 7, 1897.]

"It is important," says Charcot, "to realize that hysteria has its laws, its determinism, exactly the same as a nervous affection with a material lesion. Its anatomical lesion still escapes our methods of investigation, but it betrays itself in an undeniable manner to the attentive observer by trophic troubles analogous to those seen in the case of organic lesions of the central nervous system or of its peripheral nerves."

It is to some of these trophic troubles that I wish to call attention in the present paper.

The chief affections of the skin which have been described as occurring in the course of hysteria are the following: *erythema, dermatitis, urticaria* (including *dermographism*), *hyperidrosis, œdema, urticaria bullosum, pemphigus, herpes zoster, eczema, gangrene, pigmentation, vitiligo, lichen, chromidrosis, ecchymosis, hæmatidrosis.*

A brief description of some of the more salient characteristics of these affections is all that I shall give at the present time. I may say that, scanty as the descriptions may seem, they are based upon an extensive gleaning of the published literature of the subject, references to which are appended. My object is to give an extended view of the entire subject and of the relations of the various affections to one another, rather than to give a complete clinical picture of each one.

Erythema is one of the commoner forms of hysterical neurosis of the skin. It may form the origin or base of several other forms of eruption. The eruption of hysterical erythema presents in general nothing to distinguish it from the ordinary erythemata. In many cases, however, it tends to develop and change its character into that of a dermatitis, an urticaria, a purpura, or a gangrene. In a case reported by Schwimmer[1]

[1] Die Neuropathischen Dermatosen, Wien, 1888, p. 94.

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the lesions of erythema occurring about the ankles became infiltrated with slight extravasations of blood, so that they resembled contusions.

In other cases a slight amount of effusion takes place, loosening the epidermis and causing the appearance of a flaccid bleb, or permitting the epidermis to be pushed or rubbed partly off the corium, leaving a highly characteristic abraded surface. This is the "neurotic excoriation" of Erasmus Wilson. In some cases the inflammatory character seems grafted on the original lesion either as the result of rubbing and scratching, or of the introduction of staphylococci.

As these cases show themselves, various secondary lesions are present, sometimes rendering the diagnosis difficult. Feigning is often suspected under these circumstances. A case reported by Dr. Stelwagon[1] some years ago was supposed to have been feigned. Here the patient displayed elongated crusted patches with slightly inflammatory borders coming out in successive crops. The discomfort caused by the eruption, or the morbid sensation preceding it, caused the patient to rub the skin and thus engraft a new process upon the original dermatoneurosis.

A careful comparison of such cases, where the eruption is supposed to be feigned, with others, where all possibility of deception has been excluded, will show identical symptoms in each instance, exception only being made as regards the subsequent irritation caused by applications consciously or unconsciously made.[2]

Urticaria is one of the more usual forms of eruption met with in the hysterical condition, and is, in fact, the first symptom of many of the other skin-lesions into which it develops. When simple and uncomplicated it does not differ greatly from ordinary urticaria in appearance. Sometimes a violent emotion, as anger, or a nervous shock, as in a railroad accident, may lead to an outbreak of the eruption. Similar outbreaks may, however, occur in persons of a neurotic temperament with a predisposition to hysteria, and may in many cases be hysterical in origin. Urticaria is the basis of some of the more severe forms of

[1] A Case of Feigned Eruption. Archives of Dermatology, 1882, vol. viii. p. 286.

[2] The following papers have been referred to in connection with hysterical erythema and dermatitis:

Bowen. Boston Medical and Surgical Journal, January 26, 1890.
Bronson. Journal of Cutaneous and Genito-urinary Diseases, June, 1890.
Edebohls. New York Journal of Gynecology and Obstetrics.
Flower. British Medical Journal, 1870, vol. i. p. 307.
Hyde. International Medical Magazine, June, 1892.
Martin. Des Troubles de l'appareil vaso-moteur dans l'hystérie. Thèse de Paris, 1876.
Bulkley. Archives of Dermatology, 1880, vol. vi. p. 257.
Edwards. Quelques faits de Suggestion. Le Progrès Méd., 1890, No. 25, p. 500.
Fortner. Lancet, August 25, 1883.

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hysterical skin-disease, and we often find cases reported as "urticaria with bullous efflorescence," "urticaria hemorrhagica," and "urticaria gangrenosa." These forms will be described a little later.[1]

Closely allied to urticaria is the peculiar condition named by Barthelemy, in his admirable monograph upon the subject,[2] *Dermographism*, but also known as *autographism*, *factitious urticaria*, etc.

Dermographism is the property sometimes assumed by the skin of preserving, in an enlarged and more or less permanent form, any marks which may be made upon it. To produce such a lesion in the normal state intense and prolonged pressure, as of a tightened cord, is required, and even this produces a merely transitory and non-elevated mark. In the condition of dermographism simple contact with a smooth instrument or with the edge of the finger-nail produces an intense, persistent elevation more or less discolored in rose or white. In hysteria dermographism and urticaria may coexist, but, although arising from a common cause, they are perfectly independent of one another.

As the eruption is indolent, its existence is usually discovered by chance. Occasionally it is caused by some violent shock or emotion, or as the result of a nervous crisis; at other times it may ensue without any appreciable cause. The lesions may make their appearance after pressure with the fingers or the clothes. Sometimes an accurate pattern of a piece of lace is seen traced upon the skin. The impression of heat or cold often brings out the eruption, as washing the hands in cold water, or going out into the open air. In this the analogy to urticaria is evident.

There are several degrees of intensity of the affection. The mildest form shows itself as follows:

At a point where the skin has been irritated a white stria instantly appears, succeeded almost immediately afterward by a broader stripe of a deep rose color, perfectly flat, and on a level with the skin. This coloration lasts, as a usual thing, five to ten seconds, or half a minute at the most. When a distinct pathological condition exists, however, it may last fifteen to twenty-five minutes, and then it pales gradually and irregularly until it disappears.

In this mildest form dermographism is familiar to all. We see it in cases of eczema, in persons subject to urticaria, and in all sorts of individuals who are suffering from alimentary autointoxications. It is in no way pathognomonic of hysteria.

[1] A typical case is that of Thompson ("A Case of Factitious Urticaria." Lancet, 1893, vol. i. p. 924).

[2] Etude sur le Dermographisme. Paris, 1893. (Contains a very copious bibliography.)

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The medium condition of dermographism is characterized by a more pronounced appearance. The rose-colored line is bordered on either side by two narrow white bands, which disappear before the central one. The latter in its turn disappears in sinuous lines pinked out at the border, so that a number of rose-colored islets take the place of the band.

Barthelemy says that in analyzing the lesion above described we find the white lateral bands corresponding to a constrictive spasm of the vasomotors which determines a local anæmia at this point. The rose-colored points result from a dilatation of the vasomotors and a stagnation of the blood; so that there are at first a spasm and contraction at the periphery of the lesion; then dilatation or paresis—or even paralysis—of the vasomotors at the centre. Then, when this sort of circulatory convulsion, a true vasomotor ataxia, has passed away, the normal course of the blood returns little by little, and the skin resumes its ordinary aspect.

The severe or intensive form of dermographism as artificially developed begins like the milder form, but at the end of about four or five minutes the lesion has developed until it resembles a white cord or goose-quill under the skin, or even an enlarged and indurated vein. At the end of half an hour, an hour, or several hours, a gradual inverse evolution sets in, following the same course as in the milder cases. Even after the lesion has disappeared to the eye, leaving only a diffuse redness, it can be felt under the finger, and a slight rubbing will bring out a renewed tracing of the original mark.

The duration of the lesion varies from an hour or two to several days.

While dermographism is not necessarily hysterical in its origin any more than urticaria, yet the susceptibility to this eruption is one of the characteristics of that affection, and in those forms of hysteria which in former times were attributed to direct demoniacal influence dermographism plays an important part.

Hyperidrosis is one of the symptoms of hysteria which has been known longest. Sydenham notes it as regards nocturnal sweating. The hyperidrosis of hysteria may be general or partial. When partial it is frequently superposed on other hysterical symptoms, being limited, for example, to the side affected in hemianæsthesia. In a case noted by Martin[1] night-sweats were present; but while the paralyzed side, which was atrophied, secreted only slightly, the unaffected side was streaming with perspiration. Martin says that such observations show us a sudoral hypersecretion joining itself to disturbances of sensation and motility

[1] Des Troubles de l'appareil vaso-moteur dans l'hystérie. Thése de Paris, 1876.

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limited to one side. But we cannot establish a certain relationship between any particular symptom and the hypersecretion of sweat, because not only are the two classes of phenomena not necessarily related, but we find the hyperidrosis showing itself now on the hemianæsthetic side, and now on the healthy side, the hemianæsthetic side remaining quite dry.

Fabre[1] says that hysterical hyperidrosis is less marked in some cases during the summer than it is in the winter.[2]

Œdema is a very interesting symptom of hysteria. It has been described by Weir Mitchell,[3] Charcot,[4] and more recently by many others, and I shall not here dwell upon it at any length. It usually occurs in connection with other hysterical symptoms, as arthralgia, paralysis, or contraction. It is most commonly unilateral, although exceptions have been noted to this rule, and a generalized form has been described.

The appearance of the integument which may happen to be the seat of hysterical œdema varies. The color may be white, as in ordinary dropsies; rose colored, or red; but most frequently it is bluish or violaceous. The color usually remains the same in a given individual whatever point may be attacked and in successive attacks.

Hysterical œdema is always hard; the pressure of the finger makes little or no impression. Punctures do not give exit to serum. Gilles de la Tourette says that it is a regular œdema invading the entire circumference of the member. There are exceptions to this, however. In one case a tumor the size of an egg, of a violaceous rose color, was found seated near the external malleolus of the left leg. Such cases, excepting where the history is clear, are with difficulty distinguished from the cases of so-called giant urticaria and acute circumscribed cutaneous œdema.

On palpation the sensation given by hysterical œdema varies. The temperature of the surface may be normal, or in blue œdema it may be diminished, while in rose-colored or red œdema it may be increased. In one case of œdema of the wrist, hand, and fingers the surface was 10° to 12° C. less than on the affected side. In such marked cases the skin is cold and dry, the color blue with violaceous marblings, and it may become almost black in color.

[1] L'hystérie viscérale. Paris, 1883, p. 96.

[2] See also Comby. Hystérie larvée, Sueurs profuses des extrémités. Journ. de Méd. et de Chir. Prat., 1881, p. 344.

Sorbets. Hystérie, Froid glaciale, Sueurs profuses. Gaz. des Hôp., 1889, t. 62, p. 945.

[3] The Unilateral Swelling of Hysterical Hemiplegia. American Journal of the Medical Sciences, 1884, vol. lxxxviii. p. 94.

[4] L'œdème bleu des hystériques. Clinique des Mal. du Syst. Nerveux, 1892, t. i. p. 95.

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Sometimes the general tint may be rose-colored or red, the surface shining as in articular rheumatism, and giving the impression of an elevation of temperature, which may indeed be present to the extent of 1° to 2° C.

Hysterical œdema, whatever form it may take, is almost always accompanied by sensory troubles, often to a marked degree. Charcot has observed thermoanæsthesia.

The course of hysterical œdema is variable. It appears with or preceding the contracture or paralysis, becomes established with the motor troubles, and undergoes frequent changes of increase and diminution. The latter is highly characteristic. The œdema increases or decreases under the influence of the appearance or disappearance of the menses, of strong emotion, etc.

The duration of the affection is very variable. It may last as long as two or even five years. Its gravity is measured by that of the accompanying general symptoms.

The diagnosis of hysterical œdema when this occurs in connection with other well-marked hysterical symptoms is usually not difficult. When the œdema is rose-colored and coexists with an arthralgia rheumatism is suggested. Brodie has noted, however, that the œdema is not exactly limited to the painful joint, but has a strong tendency to become diffused over the entire member and even in localities where the articulations are unaffected. In addition there is no fever in connection with the hysterical affection. Nevertheless, it has sometimes been taken for rheumatism.

In other cases hysterical œdema has been mistaken for phlegmasia alba dolens, periostitis, syringomyelia, and Raynaud's disease. As regards the latter, similar symptoms sometimes occur in connection with hysteria.[1]

Pemphigus. This form of hysterical dermatoneurosis has long been recognized, and the term "pemphigus hystericus" is familiar. The

[1] See also Ashton, Thomas G. Angioneurotic Œdema. Philadelphia Med. News, 1893.

Börner. Ueber nervöse Hautschwellungen als Begleiterschinungen der Menstruation und des Klimax. Volkmann's Sammlung, 1888, No. 312.

Collins. Angioneurotic Œdema. American Journal of the Medical Sciences, 1892, No. 104, p. 654.

Gilles de la Tourette et Dutil. Contrib. à l'étude des troubles trophiques dans l'hystérie. Atrophie Musculaire et Œdème. N. Iconog. de la Salpêtrière, 1889, vol. ii. p. 251.

McCosh. Hysterical Blue Œdema. Annals of Surgery, 1893, vol. xviii. p 667.

Shaw and Duryee. Hysterical Blue Œdema. Brooklyn Med. Journ., 1893, vol. viii. p. 193.

Simon. Acute Angioneurotic Œdema. Johns Hopkins Hospital Reports, August, 1891, No. 6, p. 339.

Thiblerge. Un cas de l'œdème bleu hystérique. Bull. Soc. Franç. de Dermatol. et de Syph., 1892, vol. iii. p. 135.

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eruption takes on various aspects. The lesions may consist of phlyctenulæ, or of larger blebs, and it may occur alone, the bullæ rising directly from the skin without any perceptible base or areola, or they may develop from erythematous or urticarial patches. Their most frequent seat is upon the limbs, although any portion of the body may be attacked.

The lesions may be filled with serum, with serosanguinolent fluid, or, in rare cases, they may be semipurulent or purulent. Commonly the individual lesions run a rapid course, but the eruption is kept up by repeated outbreaks. Not infrequently each outbreak is connected with an hysterical attack, or in women with the recurrence of the menstrual period.

The bullæ of hysterical pemphigus may dry up and leave crusts which fall off without being followed by any mark, a pigment-stain may be left behind, or an ulcer may form at the base of the lesion and, healing, leave a keloidal scar.[1]

Herpes zoster. I am not sure that herpes zoster should be included among the hysterical neuroses. These, as I shall point out, seem to belong to the class of vasomotor affections, while herpes zoster, according to Vulpian,[2] is not the result of direct vasomotor influence. Ferré,[3] however, gives the case of an hysterical patient in whom herpes zoster undoubtedly occurred. Pains in the *left* side of the chest resembling pleurodynia were treated by a blister, which was followed by the development of a zone of sensibility around it. A few days later lancinating pains were felt in the *right* lumbo-abdominal region, starting from the dorso-lumbar hysterogenetic zone and following obliquely the direction of the intercostal nerves toward the anterior aspect of the abdomen. Two or three days later still a well-marked eruption of herpes zoster was observed in the same locality.

[1] See also Neuman. Wien. med. Jahrb., Monthly Abst., November, 1877, p. 506.

Brissaud. Eruption de pemphigus localisée a la moiété gauche du tronc chez une femme atteinte d'hémiplégia gauche (pemphigus zoster). Abeille Méd., 1879, vol. xxxvi. p. 473.

Susemehl. Deutsche Klinik, 1851, p. 87.

Mermer. Pemphigus dans les Neuroses. Thèse de Paris, 1877.

Pierrepont. Sajous' Ann. Univ. Med. Sci., 1889, vol. iv. a. 62.

Pick. Ueber ein eigenthumlich nervöse Hautaffect. bei ein hysterische Blötsinningen. Wiener med. Presse, 1880, Bd. xxi. p. 1880.

Neuberger. British Journal of Dermatology, February, 1893.

Murrell. Lancet, 1883, i. p. 447.

Kaposi. Pemphigus Neuroticus Hystericus. Wiener klin. Wochen., May 29, 1890.

Franceshi. Du Pemphigus chez les Hystériques. Thèse de Paris, 1883.

Duhring. Neurotraumatic Dermatitis Vesiculosum et Bullosum. International Medical Magazine. March, 1892.

Bondet Lyon Méd., January 1, 1893.

Bayet. Bruxelles Journ. de Méd., March 5, 1891.

Augagneur. La France Méd., May 24, 1887.

[2] Leçons sur les vaso-moteurs, t. ii. p. 556.

[3] Zona hystérique. Archives de Neurologie, 1882, vol. iii. p. 167.

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In this case the herpes zoster developed on the course of nerves having their origin on a level with the dorso-lumbar hysterogenetic zone. It should be remarked that during the period of the zoster eruption the patient was free from hysterical attacks. The hysterogenetic zone, according to Ferris's view, seemed to determine the localization of the zoster, and this latter seemed to exercise a suspensive action on the convulsive manifestations of hysteria.

The case stands alone, so far as I know, as an instance of true herpes zoster occurring in connection with hysteria. The other cases reported, as Kaposi's,[1] lack some of the characteristics of true herpes zoster, and seem to be rather cases of diffuse gangrenous patches without any arrangement along the lines of the nerves.

Eczema. It is a question in my mind whether the lesions described as hysterical eczema should not rather be included under the head of dermatitis. The reports of these cases are usually too vague to permit of exact discrimination, but those which are not in their inception erythematous are probably of a similar character to the changes in the nails with which they are occasionally accompanied. The eczematous outbreak may be local, as in a case where the eruption was confined to the lobe of one ear, recurring with each hysterical outbreak for a year, or in another instance where the attacks occurred in the flexures of the joints, and were accompanied by trophic changes in the nails. Sometimes the eczema occurs upon a basis of urticaria. Nicholski has observed twelve cases of chronic eczema accompanied by cutaneous anæsthesia. The habitual location was the hand, and the eruption was usually symmetrical. In all these cases the eczema occurred in the anæsthetic region.[2]

Gangrene. The occurrence of gangrene in connection with hysteria is not, comparatively speaking, uncommon. It may occur in several different forms, and is usually preceded by certain subjective symptoms, as tingling, itching, or darting pain.

The earliest lesion is at times an erythematous blush, or a papule; at other times an urticarial wheal, and occasionally a bulla. On the basis of this preliminary lesion a point or patch of necrosis forms, sometimes as a black eschar, at other times as a parchment-like induration, accom-

[1] Archiv f. Derm. u. Syph., 1889, Heft iv.

[2] See also Fabre. Loc. cit.
Nicholski. Revue Neurologique, 1894, p. 628.
Oulmont and Touchard. La Médecine Moderne, February, 1891, Nos. 7, 8, 12, and 19.
Frèche. Eruptions cutanées chez les Hystériques (eczematous dermatitis). Journ. de Mal. Cut. et Syph., 1896, p. 4.

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panied in some cases with a slight purpuric effusion. The eschar separates, leaving an ulcer, which may be extremely superficial and followed on healing by only a slight pigmentation, or which may be deeper and followed by a keloidal scar.

Any of the other lesions of hysteria on the skin may develop into gangrene.

The so called "herpes gangrenosus" of hysteria has nothing herpetic about it, but is a simple multiple gangrene. The lesions of hysterical gangrene of the skin may be single or very numerous, and vary in size from a pin-head to that of the palm of the hand. Any portion of the body may be attacked.

Several cases have been reported where gangrene has occurred following injuries to the skin, as burns, pricking the fingers with needles, etc., so that the question as to whether a transmitted neuritis or some reflex effect might not be involved. Such, however, is not considered likely.[1]

[1] See also Allen. Journ. Cut. and Gen.-urin. Dis., June, 1890.

Arning. Münchener med. Wochen., 1888, No. 21. (American Journal of the Medical Sciences, October, 1888.)

Bayet. Gangrènes disseminés et successives de la peau d'origine hystérique. Journ. des Mal. Cut. et Syph., 2me sér. t. vi. p. 471.

Brodie. Works, vol. iii. p. 393.

Doutrelepont. Vierteljahrschr. f. Derm. u. Syph., 1886, p. 179. Monatshefte f. Prakt. Derm., 1890, Bd. ii. p. 219.

Ehrl. Gangrena cutis hysterica. Wien. klin. Wochen., 1894, p. 330.

Fagge. Purpura Gangrenosa. Guy's Hospital Reports, 1868, vol. xiii. 3d ser.

Fagge. Erythema Gangrenosum. British Medical Journal, 1870, i. p. 151.

Féré. Note sur la gangrène spontanée de la peau chez les hystériques. Comptes Rend. de la Soc. de Biol., 10 sér. i. p. 427.

Gaucher. Hemianæsthesia and Spontaneous Gangrene of the Fingers of the Same Side. La France Méd., July 31 and August 21, 1878.

Joseph. La Presse Méd. Belge. British Journal of Dermatology, May, 1893.

Kaposi. Zoster atypicus gangrenosus. Wiener med. Wochen., 1889, No. 10.

Loebel Senger-Hoch. Discussion on simulation in hysteria. Mercredi Méd., 1893, No. 49, p. 596.

Leloir. Recherches cliniques et anatomo-pathologiques sur les affections cutanées d'origin nerveuse. Thèse de Paris, 1881, p. 117.

Petrie. Dermatitis gangrenosa. Berlin. klin. Woch., 1879, p. 509.

Quinquaud. Erythema gangrenosum. Ann. de Derm. et de Syph., 1893, t. iv. p. 254.

Renaut. Urticaire gangreneuse. La Méd. Moderne, February 20, 1890.

Riehl. Gangrena cutis hysterica. Wien. klin. Woch., 1893, p. 826.

Rooke. Lancet, 1864, vol. ii. p. 486.

Rostmann. Deutsches med. Woch., 1890, No. 23.

Schimmelbusch. Ein Fall von Selbstschädigung bei einen Hysterischen. Berlin. klin. Woch., 1872, No. 46.

Senger. Ueber spontan gangrene und simulation bei hysterie. Wien. med. Presse, 1893, p. 965.

Strümpell. Ein Fall von Schwerer Selbstschädigung bei eine Hysterischen. Deutsche Zeitschr. f. Nervenheilkunde, 1892, No. 18.

Stockwell. Dermatitis Gangrenosa. British Medical Journal, February 12, 1870.

Verrillot. Nouv. Iconog. de la Salpêtrière, September, 1895, p. 288.

Veillon. Troubles trophiques symét. des Mains, etc., d'origin prob. hystérique. Nouv. Iconog de Salpêtrière, July and August, 1892, p. 201.

Yandell. Gangrenous pemphigus. Louisville Medical News, 1879, vol. viii. p. 211.

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Pigmentation, vitiligo. Parrot[1] has published a number of cases showing the relationship between certain nervous and neuralgic disturbances, and the appearance of pigment-spots. He intimates some connection between pigmentary derangements and chromidrosis. Lebrun,[2] in his thesis, describes seven cases of vitiligo which appear to have been connected with hysteria, the appearance of the vitiliginous patches coinciding in some cases with the attacks.

Fabre[3] says that the influence of hysteria in the production of pigmentary alterations is most manifest. He has frequently observed patches of pigmentation form upon the forehead and face in hysterical persons, similar in all respects to the mask of pregnant women, while the patients were neither pregnant, cachectic, nor suffering from uterine disease. In one case of hysteria Fabre observed a yellowish discoloration upon the right upper eyelid, a sort of xanthelasma. More frequently he has noted a blackish appearance over the skin, a variety of chromidrosis. This connection between chromidrosis and pigmentary alteration in the skin is a very curious one.[4]

Lichen planus. But few cases of lichen planus have been reported in connection with hysteria, and these are not altogether convincing as regards their true etiology. Feulard[5] describes one case which presented the typical features of lichen planus, with the peculiarity that the lesions were distributed along the course of the median nerve. A second case assumed the generalized miliary form. The palmar and plantar surfaces showed characteristic lesions, and others appeared on the buccal mucous membrane, the tongue, and the lower lip.

Hallopeau-Larat, cited by Gilles de la Tourette (*l. c.*, p. 431), described a case in which patches of vitiligo were surrounded by numerous papules of lichen planus.

Chromidrosis. Lecat[6] mentions the case of a woman in whom, as a consequence of some grief during pregnancy, an hysterical condition supervened. She became deeply pigmented all over the forehead, eyelids, and face, with hyperæsthesia of the affected parts. This condition

[1] Notes sur quelques pigmentations anomales de la peau. Gaz. Hebdomadaire, Fév. 1869, p. 116.

[2] Du Vitiligo d'origin nerveuse. Thèse de Lille, 1886.

[3] L'Hystérie viscérale. Op. cit., p. 95.

[4] See also Barbe. Hystérie et vitiligo à la suite d'un opération de Battey. Ann. de Derm. et de Syph., 1894, p. 457.

Hallopeau-Larat. Nouveau variété de tropho-neuros: characterisée par des dischromies et érup. lichenoid. Cited by Gilles de la Tourette. Traité de l'hystérie, ii. Part, t. i. p. 431.

[5] Lichen plan chez les hystériques. Ann. de Dermatol. et de Syph., 1890, p. 872.

[6] Traité de la couleur de la peau humaine. Amsterdam, 1765, p. 136.

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was followed by black chromidrosis, disappearing at the end of term, but recurring during each succeeding pregnancy.

Billard[1] gives the case of a girl of sixteen, of nervous constitution, subject to a dry cough, with occasional hæmoptysis and hæmatemesis, and on one occasion a "neurosis" for six days, but without any physical signs of disease. The patient displayed on the face, the neck, and the upper part of the chest a bright blue color, which on examination was found to be the product of the sweat-glands. The coloration, which afterward spread over the front of the chest and abdomen, and later over the shoulders, arms, and part of the thighs, varied considerably in intensity at one time and another, depending on the circulation of the part. When suddenly addressed the girl's face became of a deeper tint. "She blushed blue instead of red," as Billard says. She perspired profusely at night.

Hysterical chromidrosis is usually black or blue. The symptoms are as follows:[2] without an appreciable cause, or more frequently under the influence of some menstrual disturbance, moral emotion, or intense heat, the lower eyelids, more frequently attacked than other regions, become swollen, congested, and painful, while a blackish or bluish patch of variable area shows itself, which at first is rather light in tint, but soon becomes darker, and spreads over the entire surface of the lid. In some cases the affection goes no further, but in many instances the cheeks and forehead, particularly the edge of the scalp, the nostrils, lips, ears, etc., may be invaded, and occasionally, as in Billard's case, described above, a considerable part of the surface may be invaded.

The appearances presented by the patches of disease are variously described. Sometimes the skin looks as if fine charcoal-powder had been dusted over it. In other cases, particularly when the attack is a mild one, I have observed an appearance of fine black points, looking like comedones, or as if a greasy skin had been subjected to the dust of railroad travel. Sometimes black lines are seen in the folds of the skin, as of the eyelids. Occasionally the skin looks as if it had been smeared with a mixture of grease and lampblack, and occasionally such has been the fact, for certainly some few cases of black chromidrosis have been artificially produced. I believe, however, that in such instances there has been a slight spontaneous condition of chromidrosis to act as an autosuggestion to the patient.

[1] Mémoire sur un cas particulier de cyanopathie cutanée ou coloration bleu de la peau, causée par une altération de la transpiration. Archiv. Gén. de Méd, 1831, t. xxvi. p. 453.

[2] Parrot. Article Chromidrose. Dictionnaire des Sci. Méd.

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I have not space at present to do more than sketch the appearances presented in this very interesting cutaneous manifestation of hysteria. I have endeavored in another place[1] to describe the affection at greater length.[2]

Purpura. Ecchymosis. Hysterical ecchymoses are usually found in connection with purpura and hæmatidrosis. They may occur separately, however, and are probably far more common than the number of reported cases would seem to indicate. In Magnus Huss's well-known case of hæmatidrosis the patient after an hysterical attack, accompanied by hæmatemesis, showed ecchymoses and suggillations of greater or less size over the left side of the body, and particularly about the left shoulder. After the attacks the left arm and leg remained in a state of semi-paralysis. Between the attacks the patient suffered occasionally from left intercostal neuralgia.

A case of ecchymosis by suggestion is that reported by Brown-Séquard,[3] where a mother, seeing a window-frame fall suddenly upon her child, showed immediately afterward a large ecchymosis upon the corresponding part of her arm.

Of purpura, in the narrower sense, the case reported by Rendu[4] will serve as an example. It was that of a nervous young woman in whom, following a moral shock, an eruption of purpura showed itself chiefly upon the thighs and arms. Each patch of purpura was situated upon a large papular elevation somewhat resembling urticaria. There were also marked areas of local œdema accompanied by a feeling of tension and pain, and sometimes forming very suddenly at different points. There was also a constant hyperæsthesia with sensations of cold.

Pincetta[5] reports the case of a girl of eighteen, who had suffered for a year previously with attacks of hysterical convulsions. One morning, on rising, she presented a bluish-red coloration extending over the pinna of both ears, with slight tumefaction, occurring without appreciable cause, and without other premonitory symptoms than a slight sensation of heat lasting a few hours. The discoloration was accompanied by desquamation, and disappeared in about eight days.

[1] Art. Chromidrosis. Twentieth Century Practice of Medicine, 1896, vol. v. p. 539.

[2] See also Le Roy de Mericourt. Annales d'oculistique, 1863, t. l. p. 5.
Deltil. Hysterical Chromidrosis. La France Méd., 1877, p. 186.
Fox, T. C. British Medical Journal, 1881, vol. i. p. 921.

[3] Soc. de Biologie de Paris, 1885, 4 Juillet.

[4] Recherches sur les altérations de la sensibilité dans les affections de la peau. Annales de Derm. et de Syph., 1874-'75, t. vi. p. 138.
Ann. de Derm. et de Syph., 1896, p. 419 (from Riforma Medica).

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Gilles de la Tourette[1] records the case of a girl of nineteen years, of strong hysterical antecedents, who called his attention one morning to a small red patch on the internal tibial surface of the right side. On the previous evening she had had a weeping-spell, and during that night had experienced terrifying dreams. Toward morning she had felt a sharp pain on the internal surface of the right leg, and was much surprised on rising to discover, at the painful point, an ecchymosis 5 cm. in length by 3 cm. in breadth, oval, and with the long diameter vertical.

On examination right hemianæsthesia was found to exist in the region involved by the ecchymosis. The lesion passed through the usual changes observed in similar cases, and at the end of some days had disappeared. The patient was certain that she had not received any injury at the spot, and that it had been perfectly normal when she went to bed the night before; nor had she had convulsions through the night.

Hæmatidrosis. Hæmatidrosis, or bloody sweat, is one of the most striking manifestations of hysterical dermatoneurosis. Since the appearance of Parrot's monograph[2] this affection has been regarded as a neuropathic hemorrhage, and the cases which have been published from time to time when collated are found to be strictly dependent upon the hysterical condition.

I have elsewhere[3] given a full account of this affection, and shall, therefore, at present only touch upon its salient characteristics.

In some cases the exit of blood takes place from an apparently perfectly normal skin, but this is unusual. More commonly an erythematous patch, sometimes compared to a superficial burn, makes its appearance; the epidermis becomes raised as if a blister was forming, sometimes serous at first, in other cases bloody from the beginning. The blister breaks open and serum, pure or mixed with blood, flows at first, soon changing to pure blood. Sometimes the loosened epidermis seems to float off from the subjacent corium, leaving a raw, oozing surface covered with a dew of blood. Where the epidermis is thick, as on the palms or soles, a fissure opens from which the bleeding proceeds. When the blood oozes from the apparently normal skin it soon dries, and can be wiped away, leaving a normal or slightly pale surface beneath. When a bulla has formed the process is more severe. After the bleeding has ceased, which may occur at the end of a few hours, or only after a day or so, the crust usually dries up and undergoes involution as an ordinary

[1] Nouv. Iconographie de la Salpêtrière, 1890, vol. iii. p 49.
[2] Etude sur la Sueur de Sang et les Hémorrhagies Neuropathiques. Paris, 1859.
[3] Hæmatidrosis (bloody sweat). International Clinics, July, 1896, vol. ii. 6th ser.

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blister, healing completely at the end of six to ten days. Sometimes the surface shows no trace of the lesion; at other times a pink tender spot, or a fissure if the epidermis is thick, remains. The latter is especially the case in the numerous recorded instances in which the wounds of the Crucifixion are imitated, the recurrences taking place in the hands, feet, side, and brow, week after week with perfect regularity. Now and then suppuration may take place, which delays the healing; but this is rare and accidental.

The general symptoms vary greatly, but are almost always of a highly hysterical character. Accesses of fury, attacks of lethargy, ecstasy, and the like usually precede the outbreak. Burning, stinging, and darting pains at the point to be attacked usually precede the appearance of the lesions.

Although in some cases a very considerable amount of blood may be lost, yet the patient usually enjoys fair health, or at least does not suffer from the loss of blood.

Few of the hysterical dermatoneuroses present such a variety of appearances as hæmatidrosis. I have given an outline of the chief aspects presented, and the picture must be filled in by a perusal of the histories of individual cases. Many of these will be found by reference to the bibliography appended.[1]

[1] Andrews. Purpura Occurring in Nervous Diseases. Buffalo Medical and Surgical Journal, January, 1878, p. 401.

Caldwell. Michigan Medical News, 1879, p. 249.

Cooper. (Cited by Laycock. Nervous Diseases of Women, p. 234.)

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Weir Mitchell. On Certain Forms of Neuralgia Accompanied with Muscular Spasms and Extravasation of Blood, etc. American Journal of the Medical Sciences, July, 1869.

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Anderson. Journal of Cutaneous Medicine, 1867, vol. i. p. 328.

Böens. Louise Lateau. Bruxelles, 1875.

Böens. Fin de la Comédie de Bois d'Haine. Paris, 1876.

Bourru et Burot. Hémorrhagie de la peau provoquée par la suggestion en somnambulism. Comptes Rend. de la Soc. de Biologie, 1885, 8th sér. t. ii. p. 401.

Caizergues. Cited by Gilles de la Tourette. L'Hystérie, 2me Part., t. i. p. 445.

Chambers. Clinical Lecture on a Case of Bloody Sweat. The Lancet, 1861, p. 207.

Chauffard. Hæmatopedesis. Archives Gén. de Méd., 1830, p. 572.

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Dauvergne. Annales de Derm. et de Syph., 1876–'77, t. viii. p. 121.

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Ferroud. Note sur une Stigmatisée. Bull. Méd., 1890, p. 312.

Froidefond. Contribution à l'étude de quelques hémorrhagies neuropathiques. Thèse de Paris, 1879.

Gilles de la Tourette. Considérations sur les ecchymoses spontanées et sur l'état mental des hystériques. Nouv. Iconog. de la Salpêtrière, 1890, vol. iii. p. 49.

Hellier. A Case of Hæmatidrosis (sweating of blood). Indian Medical Record, Calcutta, 1893, p. 151.

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There are other forms of cutaneous disease which have been described as occurring in connection with hysteria. These are *erythromelalgia, Raynaud's disease, ichthyosis, epithelial atrophy with rupia-like exudation of scales, phlegmonous swellings, pseudo-elephantiasis, Morvan's disease, nodules, ulcers,* etc.

In addition certain trophic disorders of the appendages of the skin have been noted: *canities, alopecia, hypertrichosis, fissure of the hair,* together with *deformities* and *shedding of the nails.*

If now we set aside the last two groups and consider the forms of disease which I have sketched in outline, we find that they belong one and all to a certain category. They are not merely a fortuitous collection of skin diseases, but belong to a series of which the first member is erythema or dermatographism. A step further we find urticaria with œdema. Then, as another stage in the series, we have the vesicular and bullar formations, and, finally, gangrene. Side by side with these we have alterations in the pigmentary deposit of the skin, hyperidrosis, chromidrosis, and hæmatidrosis. I have described these affections separately; but the fact is that in many cases as reported several of these affections run one into another, beginning with one of the earlier members of the series and developing later into a more advanced manifestation. They all, however, belong to one and the same group—the vasomotor neuroses.

Huss. Archives Gén. de Méd., 1857, 5th sér., t. x. pp. 1-129.
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Imbert-Gourbeyre. Bull. de l'académie, 1879, 3d sér., t. ix. p. 265.
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Krishaber. Multiple Hemorrhages of the Tongue and Skin at the Menopause. Ann. des Mal. de l'Orielle, 1877, t. iii. p. 38.
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Lefebre. Louise Lateau, 2d edition. Louvain, 1873.
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Raymond. Ecchymoses et éruptions pemphigoïdes de nature hystérique. Journ. des Mal. Cut. et Syph., 1891, p. 462.
Szigmondy. Lancet, 1878, vol. i. p. 593.
Titel. Ein fall von Hæmatidrosis. Arch. f. Heilk., 1876, p. 63.
Van Harlingen. Hæmatidrosis (bloody sweat). Internat. Clinics, 1896, vol. ii. p. 332.
Warlomont. Louise Lateau (Rapport Médical). Bruxelles, 1875.
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Coomes. Philadelphia Daily Item, December 11, 1891.
—— La Stigmatisée de Bahia. Archives of Dermatology, 1876-'77, vol. iii. p. 261.
—— An Italian Louise Lateau. Lancet, 1876, vol. i. p. 557.

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As regards the other forms of hysterical dermatoneuroses, erythromelalgia, Raynaud's disease, pseudo-elephantiasis, etc., these evidently belong to the same general category, or at least the vasomotor element is evident in them. The changes in the hair and nails cannot in the present state of our knowledge be brought under precisely the same head, but this, I think, is because we know so little about their true pathology.

It is a curious coincidence, and one which I think will go toward helping us in our future study of the dermatoneuroses in general, that the skin-lesions accompanying other affections of the nervous system are similar in their nature to those we have described above.

Thus Crocker[1] states that the eruptions which have been noticed in ataxy are: 1. Transitory erythema (*a*, simple; *b*, nodosum). 2. Urticaria. 3. Papular or lichenoid eruptions, probably eczematous. 4. Ordinary eczema. 5. Herpes zoster. 6. Pemphigus. 7. Pustules "like ecthyma." 8. Ulcers. 9. Superficial gangrene. 10. Perforating ulcer of the foot. 11. Falling off of the big toe-nail. 12. Leucoderma. 13. Petechiæ and Ecchymoses. 14. Unilateral sweating. 15. Œdema.

Cutaneous disease from lesions of the branch or branches of nerves below the ganglion have been described by Paget and by Mitchell Morehouse, and Keen. The nutritive and other defects that have been recorded are, according to Crocker: 1. Erythema. 2. Herpes. 3. Bullæ. 4. Ulcers. 5. Eczema. 6. Glossy skin. 7. Defects of nails. 8. Defects of hair. 9. Defects of pigment. 10. Chronic œdema, like elephantiasis. 11. Ichthyosis-like condition.

The fact that the dermatoneuroses resulting from organic disease so closely resemble in their nature those occurring in hysteria is of importance when we come to consider the question of the supposed factitious character of some of the hysterical eruptions.

Until within the last few years most of the hysterical dermatoneuroses were considered as belonging to the category of feigned diseases. The desire for sympathy, the morbid longing for notoriety, etc., were supposed to account for the artificial production of lesions in cases where this could be proved, and the same deduction was drawn in many cases where the self-infliction of skin-lesions could not be proved to have taken place.

We know now that the phenomenon of autosuggestion is one of those most conspicuous in the etiology of hysterical affections of all kinds, and

[1] Lesions of the Nervous System Etiologically Related to Cutaneous Diseases. Brain. 1884, p. 349.

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we have sufficient data to assume autosuggestion to be at the bottom of the production of many of the dermatoneuroses of hysteria. Particularly in the numerous and carefully detailed histories of the stigmatics we can trace the working of autosuggestion most plainly.

Moreover, several most interesting experiments in suggestion have been successfully performed. Mabille suggested to an hysterical man, plunged in hypnotic slumber, that a quarter of an hour after he should awake the letter V would appear at a spot upon his forearm, which he marked with a pencil, and that this letter would bleed. The phenomenon promptly appeared at the time and in the place suggested. Patches of dermatitis resembling burns and other skin-lesions have also been induced by Edwards and others through suggestion.

As a result of such experiments and of more careful observations the conviction has grown that feigning in the ordinary sense of the word has no place in the production of the hysterical dermatoneuroses, and that the term "hysterical feigned diseases" of the skin is a misnomer.

Barthelemy, in his exhaustive treatise on *Dermographism*, shows that in numerous instances the appearances presented by dermographism are produced by autointoxication of some sort. The close analogy between this condition and that of ordinary *erythema ab ingestis*, or of common urticaria, as regards their pathological anatomy and mode of production, seems to indicate that intoxication or autointoxication of some sort is the cause of their production in each case. Barthelemy proposes to employ the term "dermatoneurose toxivasomotrice" as a secondary appellation of dermographism.

Whether autointoxication or intoxication, as by lead-poisoning, etc., may or may not account for the production of hysterical symptoms of other kinds, I am not prepared to express an opinion. I am inclined to believe, however, that such causes may have influence in the production of some of the skin-manifestations of hysteria. To go further into this subject would, however, lead me too far from the original object of this paper, which has been to group together and display the hysterical neuroses of the skin so far as our present knowledge of these affections will permit, and to claim for them a place in our nosology.[1]

[1] The forms of disease referred to in the following notes have not been described at length in the present paper. I hope to have an opportunity to refer to them in a future communication.

Fournier. Hystéro-neurasthenie secondaire Algiditées périphériques intenses; ébauche de Maladie de Raynaud, etc. Bull. Soc. Franç. de Derm. et de Syph., 1893, vol. iv. p. 314.

Rosenthal. Die vasomotorischen Innervation-Störungen bei Hysterie (pseudo Raynaud's disease). Wien. med. Presse, 1879, p. 802.

Levy. Maladie de Raynaud et érythromélalgie d'origin hystérique. Soc. de Biol., October 20, 1874.

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DISCUSSION.

DR. CHARLES K. MILLS: This paper is one of considerable interest to me, and suggests one or two lines of thought It is a question, however, whether the term dermato-hysteria has not by some authors been made to embrace too much. A number of the neuroses alluded to by Dr. Van Harlingen are properly classed as hysterical neuroses, but for some of them I would reverse his method of expressing the subject—that is, I would say that, instead of the case being a hysterical dermato-neurosis the hysteria occurs in the course of a dermato-neurosis. These cases are not in a true sense hysterical. These remarks would apply to such cases as are embraced in the second order of cases to which the author refers, such as Raynaud's disease and erythromelalgia, and probably to some of the others.

DR. MILTON B. HARTZELL: I would like to speak of a certain class of hysterical cases known as acute multiple gangrene. A limited number of cases have been reported under various names, and in looking over the literature on the subject some time ago I was struck by the fact that in a very large proportion of the cases, nearly all of which occurred in hysterical women, the gangrene was preceded by the same sort of traumatism—that is to say, a burn produced either by heat or one of the mineral acids. It is an extremely curious thing that in so large a proportion of cases, probably 75 per cent., the gangrenous lesions are preceded by some weeks or months by burns. The gangrene did not always occur at the site of the traumatism, but sometimes at remote places. In two cases this multiple gangrene occurred in men, and in both it was preceded by some weeks by burns with sulphuric acid.

Lannois. Paralysie vaso-motrice des extrémités ou érythromélalgie. Thèse de Paris, 1880, p. 11.

Weir Mitchell. Hysterical Rapid Respiration, with Cases (epithelial hypertrophy). American Journal of the Medical Sciences, March, 1893.

Trelat et Castex. Phlegmonous swelling and ulcers. La France Méd., 1877, t. ii. p. 673.

Souques et Gasne. Un cas d'hypertrophie des pieds et des mains avec troubles vaso-moteurs, des extrémités chez une hystérique. Nouv. Iconog de Salpêtrière, 1892, p. 281.

Thibierge. Un cas de pseudo-éléphantiasis neuropathique du membre supérieure chez une femme hystérique. Bull. et Mém. Soc. Méd. des Hôp de Paris, 3e sér., t. xi. p. 202.

Ducamp. Hystérie et Maladie de Morvan. Gaz. Méd. de Nantes, 1890, t. ix. p. 1.

Jaeger. Nodules and Ulcers. Ann. de Derm. et de Syph., 1888, p. 560.

Marcamo. Ulcers. Le Progrès Méd., 1878, p. 514.

Ferré. Note sur un trouble trophique des cheveux survenant à la suite des attaques chez les hystériques. Comptes Rendus de la Soc. de Biol., 1885, p. 594.

Neisser. Ueber ein merkwürdige Haarausfalf bei einen Hysterischen. Schles. Gesellsch f. Vaterl. Kult. Breslau, 1888, lxv. p. 57.

Ladame. Alopecia. Revue Neurologique, 1896, No. 1, p 2.

Tronchet. Panaris symétrique surperficiel chez une hystérique. Bull. Soc. de Méd. et de Chir. de Rochelle, 1891, p. 64.

Falcone. Ueber spontanes Abfall der Nageln bei einen Hysterischen. Deutsche med. Wochen , 1886, vol. xii. p. 717.

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DR. VAN HARLINGEN: The subject is a very large one, and I hardly knew how to get through with it without offering this paper as a sort of preliminary sketch, for it was impossible to go into all the points. With regard to what Dr. Mills said, I am inclined to agree with him. Some cases which have been called hysterical may not be such Those which he mentions—erythromelalgia and Raynaud's disease—belong to this category. I have simply noted cases of this kind for the sake of completeness, but have not investigated them. The earlier series which I have enumerated in the paper are supported by clinical proof. For instance, when we have an outbreak upon the skin immediately following an attack of hysteria major with spasm, we have something of that sort. Such cases are truly hysterical, and can easily be distinguished from those that are not.

As to the form of disease, gangrene, which Dr. Hartzell mentions, it is interesting to note that almost all of the cases occurred in persons who had been injured in some way, the injury in some cases producing gangrene by suggestion.

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A CLINICAL RE-EXAMINATION OF THE MOTOR SYMPTOMS OF CHOREA.

By S. WEIR MITCHELL, M.D., and J. H. W. RHEIN, M.D.

[Read May 5, 1897.]

In 1881 one of the authors of this essay pointed out that the previous descriptions of Sydenham's chorea were imperfect, and that its symptoms admitted of classification into clinical species or at least varieties.

Taking Dr. Weir Mitchell's[1] grouping as a basis, the cases at his clinic have within a year been re-examined with care and with corroborative results.

From the text-books one is led to believe that the movements follow a definite type in all cases, with only occasional variations. It is claimed that the movements are continuous when the disease is advanced, rendering voluntary muscular acts impossible or to be completed with the greatest difficulty; that the movements are increased by voluntary acts, though sometimes for a time quieted during the effort.

The movements are said to be at first simply awkward and incoordinate—a condition which gradually develops into a constant, irregular spasm, clonic in character. This includes practically all that can be found in the books relating to the movements of chorea, save the delineation to be found in Dr. Weir Mitchell's lectures, to be quoted later.

In this study an attempt is made to elaborate more fully the descriptions of the choreiform movements.

[1] Lectures on Nervous Diseases of Women, by Dr. S. Weir Mitchell, 1881.

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Some of these cases cited present familiar enough symptoms and are examples of the type usually described. They are briefly reported in order to complete the picture of chorea and that they may be contrasted with the less familiar and, if not unrecognized, certainly undescribed types. The histories are purposely condensed, since much of the data does not in any way pertain to the subject under discussion, but full notes of all the cases are accessible.

Cases illustrating first type of movements:

CASE I.—F., aged ten years. Eleventh attack. Movements general, worse on the right side, and continuous during rest. When two points were brought together the movements ceased or lessened greatly. The coat was buttoned without difficulty and a glass of water put to the mouth without the slightest danger of spilling. It may be truly stated that during fine, voluntary effort there was a total absence of the jerking.

CASE II.—F., aged six and one-half years. First attack. The movements were continuous and distinctly choreiform, and there was at the same time a suggestion of tremor. There were alternate flexion and extension of the hand seventy-five times a minute. Movements were entirely absent when she attempted to put a glass of water to her mouth, while writing her name, and when sewing. She also was able to pick up a spoonful of water without spilling; in other words, small, fine, muscular acts occasioned an entire disappearance of the movements for the time. When the muscles again resumed a position of rest, at once the choreiform movements recurred.

CASE III.—M., aged ten years. First attack. Movements severe, general, and continuous. Two points were brought together quietly, a glass of water held at arm's length without spilling, and all signs of the movements disappeared while he wrote his name. When a complicated act was attempted, like buttoning the coat, there was for the time an increase.

CASE IV.—M., aged eight years. The movements were continuous and general when at rest. They ceased entirely upon every attempt at voluntary muscular effort.

CASE V.—F., aged ten years. First attack. Continuous general movements. Two points were approximated well and a glass of water carried to the mouth quietly.

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CASE VI.—M., aged twelve years. First attack. Movements continuous and general, disappearing entirely when endeavoring to bring two points together or when the other tests were employed.

CASE VII.—M., aged seven years. First attack. General continuous movements, worse on the right side. They disappeared when writing his name as well as when other voluntary acts were made.

CASE VIII.—F., aged ten years. First attack. Continuous general movements, quieted by intentional efforts.

CASE IX.—M., aged eight years. First attack. General continuous movements. All the movements disappeared on fine muscular acts.

CASE X.—F., aged sixteen years. First attack. Continuous left-sided movements, which totally stopped when voluntary acts were attempted. She drew with surprising accuracy a straight line, free hand. Two points were brought together perfectly, with no sign of unsteadiness during the act.

CASE XI.—F., aged eight years. First attack. The movements were right-sided and continuous during rest. In making an effort to write her name the movements for the time disappeared entirely, and a glass of water was carried to the mouth with perfect muscular composure. This was the invariable result of voluntary muscular effort in this case.

CASE XII.—F., aged thirteen years. Second attack. Right-sided continuous movements. She wrote her name quietly, and other muscular efforts effected for the time total disappearance of the movements.

CASE XIII.—F., aged fourteen years. First attack. General continuous movements. Two points were brought together quietly; raising a glass of water to the mouth quieted the movements—in fact, all muscular effort short of fatigue caused the movements to cease for the time.

CASE XIV.—M., aged eleven years. Fourth attack. Continuous left-sided movements. Two points were quietly approximated and a glass of water held without spilling. Any effort causing fatigue or needing continuous exertion increased the movements.

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CASE XV.—F., aged twenty years. First attack. Movements left-sided and continuous. This was a striking case of pure, passive chorea. Upon any muscular effort of the involved muscles the choreiform movements vanished entirely. The patient was able to draw a straight line, to cut faultlessly with a pair of scissors along a line drawn on paper, and to drink from a glass held in the hand without the slightest evidence of the disease.

CASE XVI.—M., aged seven and three-quarter years. First attack. General continuous movements quieted by volition and fine muscular efforts. Two points were approximated perfectly, every sign of chorea for the minute disappearing. (See writing).

CASE XVII.—F., aged six years. First attack. The movements were continuous and general. When attempting to hold a glass of water in the hand or to perform delicate muscular acts the movements disappeared. Violent muscular action increased them everywhere; fixed attention had no effect. (See writing.)

CASE XVIII.—F., aged thirteen years. Third attack. Marked continuous movements. She held a glass of water at arm's length motionless, brought two points together quietly, and wrote her name without the slightest obvious trouble.

Cases illustrating second type of movements:

CASE XIX.—M., aged twelve years. First attack. Movements

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general, worse on right side, continuous during inaction. The movements when at rest were moderately severe, but the slightest attempt to use the hands increased them markedly. On reaching for a glass of water they became so immoderate as to render the completion of the act impossible. To write her name was quite beyond her. She was incapable of buttoning her coat or otherwise dressing herself. While at rest the movements subsided largely, but never disappeared.

CASE XX.—F., aged twenty-two years. The movements were continuous and general. A glass of water when held out from the body was spilled, and other voluntary muscular effort increased the movements.

CASE XXI.—F., aged seven and one-half years. First attack. Right-sided continuous movements. Fine muscular effort increased them. (See writing.)

CASE XXII.—F., aged ten years. Second attack. General continuous movements, worse on the right side. Spilled a glass of water when raised to the lips. Movements were increased on trying to write, to bring two points together, or to make any fine muscular effort.

CASE XXIII.—F., aged four and one-half years. First attack. Movements general and continuous, worse on the right side. Fine volitional effort and also violent coarse muscular efforts increased them.

CASE XXIV.—F., aged nineteen years. Second attack. General, continuous movements, increased when attempting to put a glass of water to the mouth or bringing two points together.

CASE XXV.—F., aged six years. First attack. Left-sided continuous movements. A glass of water was spilled when held in the hand. Fine muscular acts and efforts of volition increased the movements. When attempting to fasten her shawl with a safety-pin the inco-ordination became so excessive as to make the act quite impossible.

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Cases illustrating third type of movements:

CASE XXVI.—M., aged five years. First attack. The movements were confined to the right side, and during rest were practically absent, only an occasional slight jerk being observed from time to time. When an attempt at voluntary movement was made, such as raising a glass of water to the mouth, the twitching became at once so violent as to spill the water. An attempt to write his name induced extremely inco-ordinate movements. The choreiform motions were practically absent until muscular effort was made.

CASE XXVII.—F., aged thirteen years. First attack. Movements during rest were absent entirely for varying periods, or, if present, only of slight degree. The smallest muscular efforts, however, threw the group of muscles used into the most surprising condition. Violent large choreiform movements appeared and continued while the effort lasted. Afterward they disappeared almost entirely, and only rarely recurred during inaction.

Cases illustrating fourth type of movements:

CASE XXVIII.—F., aged eleven years. First attack. The movements were rhythmical and rotary, yet possessed the character of the choreiform movements. They were not continuous. The various tests used failed to make any perceptible difference in the character of the movements. When a glass of water was placed to the mouth, the name written, or any fine or coarse muscular effort attempted, the movements persisted, unaltered in kind and extent.

CASE XXIX.—F., aged six years. Second attack. Movements continuous and general. Here again voluntary muscular acts, fixed attention or effort of the will altered the movements little or not at all.

Case illustrating admixture of types:

CASE XXX.—F., aged nine years. Second attack. Right-sided continuous movements, which finally became general. She wrote her name with perfect ease, the movements ceasing entirely. Other fine muscular acts gave similar results. A second examination, made about a fortnight later, disclosed a changed condition. The movements during rest were barely perceptible, but became

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marked when she attempted to button her coat or to make any other similar muscular effort.

It was learned that the same condition had probably existed at the onset of the disease. Within a short time this case presented symptoms of two distinct types. First, the condition in which voluntary muscular effort was necessary to render inco-ordination manifest. Secondly, the state in which movements were continuous and increased by voluntary effort.

These cases, all examples of Sydenham's chorea, present, in that aspect of the clinical history which relates to the movements, a striking diversity. Four different types of movements may be distinguished. In the first type the movements during periods of muscular inaction are continuous. The hands lying in the lap of the patient are in constant motion. But when the patient raises to his mouth a glass of water or performs any act requiring a like delicate muscular effort there is witnessed an entire disappearance of the movements, lasting throughout the muscular effort. This appears to be a phenomenon quite beyond the influence of the will, and suggests that inhibition, for the time, is increased. (Cases I. to XIII. inclusive). In a second type there is continuous clonic contraction of the affected muscles during rest, while every attempt to perform muscular acts is attended with a surprising increase in the violence of the jerking, apparently independent of and beyond volitional control. It is impossible for one suffering from this variety of the malady to complete satisfactorily any voluntary muscular act. This condition suggests, contrary to that presented by the first type of movements, a lessened inhibition manifested during willed muscular efforts. This is the usual type described. (Cases XIV. to XXVI. inclusive.) A third, and the rarest type of the movements, is that which becomes evident only on attempts to perform a muscular act. The hands at rest move, if at all, only slightly and at rare intervals; but on attempting to use them the twitchings become sufficiently active to prevent or greatly to interfere with the performance of the act. (Cases XXVI. to XXVII.) A fourth type is illustrated in a small number of cases, in which the movements,

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continuous during rest, are but slightly altered by the tests employed. (Cases XXVIII. and XXIX.)

It is the third type which presents points of unusual interest. It might be claimed that the cases illustrative of this type were only in an incipient stage of development, when such a condition might be expected; but in the two cases cited (Cases XXVI. and XXVII.) the movements which took place upon applying the tests were so marked as to clearly demonstrate that the disease was fully developed.

Furthermore, in one case (Case XXVI.) the same type remained unchanged throughout the whole course of the disease.

In one case (Case XXX.) two types were observed, appearing at different stages of the disease. Voluntary effort at one time was the signal for an entire disappearance of the movements. There was, however, a history of having at times spilled water from a glass and dropped things from the hands.

It is difficult to say to what extent this admixture of the types existed in these children, as many of them were out-patients, and they could be seen but once a week. It seems to us, however, that in some cases the same type may persist throughout the disease, and that, on the other hand, more than one type may be present in the same case at different stages of the disease, though this requires further study.

En Résumé.—It appears that there are (1) cases of chorea which show, some at one stage of the disease, some throughout their course, an absence of movement during rest, requiring muscular action to develop what may be either mild or severe choreiform movements; (2) there are cases in which the movements are continuous during rest, but become greatly increased on intentional effort; (3) there are cases with severe choreiform movements which disappear entirely when muscular acts are performed; (4) in some cases the movements seem to be unaltered by voluntary muscular efforts; (5) there are cases which present during their course at different times more than one of the types described.

If Sydenham was familiar with these phases of the affection, we can find no evidence of it in his descriptions. He states:

"If the hand of the same side be applied to the breast or any

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other part of the body, the child cannot keep it a moment in the same posture, but it will be drawn into a different one by a convulsion, notwithstanding all its efforts to the contrary.

"Before a child who hath this disorder can get a glass or cup to his mouth he useth an abundance of odd gestures; for he does not bring it in a straight line thereto, but his hand, being drawn sideways by the spasm, he moves it backward and forward, till at length the glass, accidentally comes nearer his lips, he throws the liquor hastily into his mouth and swallows it greedily, as if he meant to divert the spectators."

We can find no careful description of these varieties of choreiform movements earlier than that in Dr. S. Weir Mitchell's lectures on *Nervous Diseases*. In his chapter on chorea he makes the following classification: First, those in which there are awkwardness and inco-ordination of voluntary movements, followed sooner or later by automatic or unwilled clonic spasms of various parts. Second, irregular movements, only occurring during willed actions. Third, constant automatic, irregular clonic spasms, usually of the hands; but during volitional acts these entirely vanish, and the most complicated acts are well performed without obvious inco-ordination.

Bernt (1810), quoted in Osler's[1] monograph, recognized that in some cases the movements disappear when the patient stands up.

Osler quotes also Dr. Weir Mitchell's classifications without further comment.

Robertson, in 1805, states that the patients affected with this disease have no control over their actions by any efforts of volition.

In his discussion of the movements of chorea Gowers asserts as typical of the disease that the movements are continuous and violent, and that they are "always increased by excitement and by attempts at voluntary movement;" and, further, "voluntary movement is always, in severe cases, irregular;" but, on the contrary, we have seen and cite in this paper many cases in which extremely violent movements vanish entirely during the voluntary act.

Dertz, in an inaugural dissertation on chorea, published in 1872, refers to the increase of the symptoms when a voluntary effort is

[1] Osler: Chorea, 1894.

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made, and states that volition quiets for the time, only to be followed by an increased amount of motion.

Sturgis,[1] in 1893, described two varieties, occurring in young children, of long duration and of moderate degree. First, the symptoms were best when the patient was unnoticed; and, second, efforts of will showed a considerable power of control, and simple muscular acts without the control made apparent the unsteadiness of the disorder.

Ziemssen (in Sturgis) considers the incessant twitchings as characteristic, while they may be sometimes spontaneous and sometimes excited by voluntary impulses.

More recently some have recognized, though not to its full importance, that on voluntary muscular action the movements may disappear (Blocq[2] and Sinkler[3]).

Similar quotations could be multiplied indefinitely, with a fuller or more accurate description of this phase of the disease in none.

What significance these facts possess therapeutically we shall not attempt to say, but they are certainly of undoubted clinical interest.

There can be little doubt that Sydenham's chorea is a disorder the seat of which is in the motor areas of the cerebrum. If there were any doubt as to this it should be settled by the cases in which distinct local trouble of these regions, specific or from a thrombosis, has given rise to typical unilateral choreoid motion. In the various forms of post-hemiplegic disturbance of motion may be observed in imperfect shapes all the types of motor disorders set forth in this paper.

Chorea is, however, a very distinct clinical grouping of symptoms; and it may be better, on the whole, to reserve for it the label chorea, and so to speak of the post-paralytic motor symptoms as choreoid or choreiform. Locally, they offer unmistakable resemblance to the malady chorea; but they also may present, when serious, mental and other peculiarities not to be met with in the choreoid products of local disease of the motor areas and perhaps of the internal capsule. A more complete study of these is to be desired.

[1] Sturgis: Chorea. London, 1893. [2] Blocq: Traite de Médicine, 1894. Paris.
[3] Sinkler: Chorea. A Text-book on Nervous Diseases, by Dercum, 1895.

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CONSUMPTION NOT CONTAGIOUS.

By CHARLES WINSLOW DULLES, M.D.

[Read June 2, 1897.]

In the past eight or ten years the newspapers of most of our cities have contained numerous statements intended to prevent the spread of consumption by convincing the people that the disease is contagious. These statements have usually been made by too enthusiastic individuals in the profession, and sometimes by Boards of Health acting in their official capacity; but I do not know that any thoroughly conservative and dignified medical body has ever recommended the compulsory notification of consumption, although the matter has been repeatedly discussed by such bodies. The motives of those who wish to impress upon the community the idea of the contagiousness of consumption must not be questioned, but it is not improper to suggest that this theory may be somewhat strained in its application. I have for years been interested in this subject, partly from my connection with the Rush Hospital for Consumption, in Philadelphia, and partly from the interest every one feels in the matter; and I have collected some notes in regard to it that confirm the conviction founded on my own observation that it is improper to speak of consumption as a contagious disease, and my doubt of the propriety of considering it as to any marked extent infectious. I know that a number of interesting coincidences have been observed, showing the frequent occurrence of consumption in certain buildings; but I think a just estimate of the significance of these observations cannot be made at present, and that they deserve critical attention before they are regarded as conclusive; for it does not appear from what is recorded that the reporters and col-

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lectors of these cases have taken into consideration all the conditions that might tend to promote the development of consumption.

Almost all believers in the infectiousness of consumption have founded their arguments upon experiments that do not seem so conclusive when we reflect that the results of inoculation experiments conducted upon animals of a weak and unresisting constitution, and under circumstances most favorable to the destruction of their health and life, ought not to be compared without reserve to the dissimilar conditions of human beings who usually have the supposed *materies morbi* brought into contact with their unbroken cutaneous or mucous surfaces and, in the case of the lungs, only after sifting through the nasal passages.

A curious line of argument in support of the contagion theory, just now, is the claim that since the general promulgation of this theory there has been a decrease in the number of deaths from this disease. This diminution is, I think, real, although in some places it has been unquestionably exaggerated owing to a misapprehension of those who report it. For example, a certain elation has been felt by the New York Board of Health over a reduction of the mortality from consumption in that city. This elation was not at all remarkable, but it was corrected when attention was called to the fact that the figures used in recent years included rural sections of New York that did not come into the statistics of previous years, and to the fact that restrictive laws adopted by Boards of Health often put too great a strain upon the candor of medical men, and lead them to report cases that they have reason to believe are cases of consumption under the head of some other disease, so that, for example, pneumonia, bronchitis, congestion of the lungs, and such titles are employed to cover up what is regarded as an uncomfortable fact.[1] I am informed also that in Philadelphia certain insurance societies refuse to pay their policies in case of death from consumption, and that as a consequence many cases of consumption are now reported under other titles. It is impossible, therefore, to speak very positively as to the exact rate of diminution of consumption; but the statistics of all civilized countries show that for

[1] Medical Record, February 13, 1897, p. 244.

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the last twenty-five or more years there has been a pretty constant and fairly even diminution in the number of deaths from consumption, quite irrespective of any attempts at isolation of the cases or systematic disinfection of the sputa. Very recently Dr. Samuel W. Abbott has published an interesting letter,[1] accompanied by a diagram showing the comparatively even reduction of the mortality from consumption in Massachusetts in forty years, from 1853 to 1893, from forty-two to twenty-three per ten thousand of the population.

The zeal with which some medical men have pressed the idea that consumption is a contagious disease would naturally lead to a very exaggerated fear of the disorder, and in spite of the feeble and scattered and utterly inadequate attempts to limit its dispersion, it is comforting to observe that although countless millions of tubercle bacilli are spread abroad in public places and public conveyances, they do not produce the terrible results that one might naturally expect. It is, furthermore, comforting to know that it is hard to find in the world a single careful observer connected with an institution in which large numbers of consumptives are gathered who accepts the theory that consumption is in any proper sense of the term a contagious disease. I am not unaware of the instances, cited by a few writers, that point to a certain degree of communicability of consumption, or unfamiliar with papers like that of Dr. Kolb, of Kaiserlauten;[2] but these may be offset by the observation of those who have been most in contact with large numbers of the disease. Dr. C. Theodore Williams, of the Brompton Hospital for Consumptives, in London, published an article in 1882, in which he gave a summary of the experience of this great hospital in the matter of the contagiousness of consumption. The figures indicate that only four persons in a number that I think may be fairly estimated at about five hundred, including resident medical officers, clinical assistants, matrons, superintendents, nurses, servants, gallery-maids, porters, secretaries, clerks, dispensers, chaplains, physicians, and assistant physicians, had contracted the disease in

[1] Journal of the American Medical Association, April 10, 1897.

[2] Beobachtungen über Tuberculose in Gefängnisse. Zeitsch. für Hygiene und Infectionskrankheiten, 1895, xix., 484–506.

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the hospital.[1] In 1883 Dr. Williams said, at a meeting of the Medical Society of London: "the evidence of the Brompton Hospital distinctly negatives any idea of its contagion in the ordinary sense of the word."[2] At the same time, Dr. Drysdale said that he had for several years searched diligently for a case of transmission of the disease among his phthisical patients, but had failed to find one.[3] In 1895, Dr. Arthur Ransome, Professor of Public Health in Owens College, Manchester, published an interesting article entitled "Consumption Scare,"[4] in which he refers to the alarming leaflets scattered broadcast in England (as they have been scattered in this country), and maintains that hospitals for consumption are not hotbeds of infection, as according to the contagion theory they should be, but that the universal testimony of physicians of these institutions is that "no such conveyance of the disease can be traced in any such institution." He furthermore says (and in this my own observations agree), "it would almost appear from the statistics brought forward, that their wards were the safest places in which susceptible persons could take up their abode." "I might say," he adds, "that my own personal experience after fifteen years at the Manchester Hospital for Consumption would be entirely favorable to this view."

At a meeting of the Cambridge Medical Society of England, some time ago,[5] the communicability of phthisis was discussed, all the members having been asked by post for their experience. Out of thirty-eight replies, thirty-four were negative. At that time a statement was made by Mr. Lawrence Humphrey of the number of cases in which contagiousness could be suspected in the Brompton Hospital, as follows: Of 4 resident medical men (one for twenty-five years) none had any lung disease; of 6 matrons, none had consumption; of 150 resident clinical assistants, 8 became consumptive, 5 died, but in only one was the disease developed during residence. Since 1867, of 101 nurses, only one died of phthisis, and that after leaving the hospital. Before 1867, 6 died, 3 of

[1] British Medical Journal, September 30, 1882.
[2] Lancet, February 24, 1883, p. 312.
[3] Ibid, p. 321.
[4] Medical Chronicle, January, 1895.
[5] Lancet, February 24, 1883, p. 323.

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phthisis, but only one became ill and consumptive while resident, and she had a consumptive sister. Of 32 gallery-maids, since 1867, none developed phthisis while in the hospital. Of 20 house-porters, 5 died, but none of consumption.

At the Chest Hospital, Victoria Park, London, during the last fifteen years, of 5 resident medical officers, all were alive and well; of 2 matrons, none had consumption, and no clinical assistant was known to have developed lung disease at the hospital. One nurse, out of 50 or 60 in the last few years, became consumptive while at the hospital, and died after a year's illness.

Very recently Dr. Stubbert, speaking for the only hospital in New York for this class of patients, stated that there had not been a case of infection among the attendants.[1] The experience at the Rush Hospital for Consumption, in Philadelphia, has been precisely the same.

In this connection I would refer to a paper by Kirchner,[2] who sought many times for tubercle bacilli in the dust of rooms occupied by a large number of consumptive patients, and found them in only one instance. The comparative innocuousness of dust that might fairly be considered the most dangerous conceivable is further indicated in an article on the "Dissemination of Tuberculosis by Infected Dust,"[3] in which Mr. Clifford Beale, Physician to the Victoria Park Hospital for Consumption, of London, says: "The theory has been so readily established that tuberculous disease may be, and probably often is, conveyed into the receptive lungs by means of inhaled dust, and precautions against the possibility of such conveyance have been so widely advocated, that it would seem to be superfluous at the present time to offer any observations or criticisms which might tend to throw doubt upon so simple and satisfactory a demonstration; but, however satisfactory the facts may appear to be when looked at from the purely experimental point of view it must be confessed that from the clinical standpoint they admit of considerable discussion. In order to satisfy the clinical

[1] Medical Record, February 13, 1897.

[2] Untersuchungen von Staub auf Tuberkelbacillen. Zeitschr. für Hygiene und Infektionskr., 1895, xix. pp. 153-160.

[3] Lancet, February 24, 1894, pp. 470, 471.

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mind it is necessary that evidence should be forthcoming to prove that those who are especially liable to the inhalation of infected dust should also be more prone to tuberculous disease than others who have not been so exposed. It is to the records of the hospitals for the treatment of phthisis that we should naturally turn for such evidence, and more especially to the records of the years anterior to the publication of Dr. Cornet's observations. It has, however, been abundantly proved that no such evidence is obtainable in this country. To take the experience of the chest hospitals at Victoria Park and at Brompton respectively, the figures collated and published by Dr. Andrew and Dr. Theodore Williams made it clear that no special liability to tuberculous disease could be demonstrated among the medical and nursing staffs of these hospitals during a period of twenty years. Quite recently Drs. Heron and Chaplin, in an article entitled "The Relation of Dust in Hospitals to Tuberculous Infection,"[1] published the results of a series of experiments made upon susceptible animals by actual injection of dust taken from wards occupied almost exclusively by tuberculous persons, and have shown that such dust possessed but little infective power. From these observations it must be concluded that the dust of a consumption hospital is not especially dangerous to those who must of necessity inhale it, nor does it always set up tuberculous disease in susceptible animals when introduced by way of direct inoculation."

Mr. Beale then describes a study of the effect of breathing dust that might be assumed to be as thoroughly filled with the bacilli of tuberculosis and their spores as any dust could be. He inquired of some of the largest paper-mills in England and Scotland, through the boards of managers and medical officers, in regard to the occurrence of tuberculous disease among persons employed in their mills, and especially in the sorting-rooms, at a time when hospitals for consumption did not practice disinfection. In the latter, as is well known, there is an enormous amount of dust suspended in the air, which is constantly breathed by persons at the age in which tuberculosis is most easily acquired. Although he found that no attempt

[1] The Lancet, January 6, 1894.

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was made to disinfect the rags, he could not find that there was any frequent occurrence of tuberculosis in the persons exposed to this presumptive danger. He found also that it was the opinion of persons connected with paper-mills that work in this particular atmosphere was not a cause of tuberculous disease. He found no case whatever of tuberculosis of the skin. Some replies which he quotes indicate that these were carefully prepared, with due appreciation of the importance of the subject. He admits that there is no positive evidence that in any of the places investigated there were rags infected with tuberculous matter. But the conclusion to which he has come is, that the facts he has gathered "go to support the view derived from the vital statistics of the consumption hospitals that presumably tuberculized dust is not a striking factor in the dissemination of tuberculous disease," and that "clinical observation abundantly shows that, in those very places where dust is most likely to be tuberculized, tuberculous disease does not appear to be disseminated." This interesting article confirms, as the author states, the deductions of Drs. Heron and Chaplin in their paper on the relation of dust in hospitals to tuberculous infection, in which they published the results of a series of experiments made upon susceptible animals by injection of dust taken from wards occupied almost exclusively by tuberculous persons, and have shown that such dust possesses but little infective power. From these observations it must be concluded that the dust of a consumption hospital is not especially dangerous to those who must of necessity inhale it, nor does it always set up tuberculous disease in susceptible animals when introduced by way of direct inoculation.

In the article alluded to, Drs. Heron and Chaplin[1] describe one hundred inoculation experiments made with dust from long uncleaned passages, shutters, pieces of furniture, and so forth, in the Brompton Hospital. In the entire series they produced tuberculosis by inoculation in guinea-pigs only twice. In reporting their own investigations they say it is very easy to attach too much importance to the results of research of this kind when it deals with only one hundred experiments, adding: "We, however, think we are justified

[1] Lancet, January 6, 1894, pp. 14-16.

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in stating that the outcome of our work shows that in the wards and out-patient department of a hospital where a very moderate amount of care is taken to prevent the spread of infection from the expectoration of tuberculous persons, there is, within the limits of our observations, surprisingly little evidence of the escape of tuberculous bacilli to become a source of infection. Now, although it is true that the tuberculous bacillus probably retains its virulence at least as well as any other organism does when it is living a non-parasitic life, still it must be remembered that there exists no experimental proof to guide us where human beings are concerned, and, therefore, it is not known that it follows because tuberculous bacilli will kill a guinea-pig or a rabbit after the micro-organism has been lying in sputa which have been drying on a floor for, say, six weeks—we say it does not follow that, because the bacilli can do this—they could, therefore, in like circumstances, kill a man. It is known that the anthrax, which will surely kill a guinea-pig, is not by any means certain to kill an ox. In like manner there exists no proof that the tubercle bacillus which is taken from drying sputum, and which is surely fatal to the guinea-pig, will also kill a human being. It may be highly probable that it will do so in favorable circumstances, but that is the utmost that can be safely said within the limits of our present knowledge."

The observation of large hospitals for consumption is borne out by that of resorts for consumptives. It nowhere appears that the gathering of consumptives in certain places is an occasion of consumption among the original inhabitants of these places. Within a year it has been reported that there was a slight increase in the number of deaths from consumption in the Adirondacks in New York, but this is attributed by Dr. Trudeau, not to communication of the disease, but to deaths of persons who have come to the Adirondacks already consumptive and too late to be saved from death. In German health-resorts, like that of Göbersdorf, it has been found that the death-rate diminished after the establishment of institutions for the treatment of consumption. There is a simple and natural explanation for this which does not compel us to go so far as to assert that the proximity of consumptives is *per se* an advantage. It is enough now to show that it is not *per se* a

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disadvantage. Very recently an interesting letter was published by Dr. Clinton Wagner, of New York,[1] quoting one from Dr. S. E. Solly, of Colorado Springs, who sums up his experience and observation as a specialist by saying that "the dangers of contagion from a consumptive are so easily controlled that it is by no means necessary to separate consumptives from healthy persons. . . . At Colorado Springs the consumptives mingle with the other residents of the city on all occasions—at church service, theatre, concerts, and in the overheated and crowded rooms of private residences during social functions; they reside in the same hotels, boarding-houses, and private dwellings with those not afflicted with the disease, and no attempt at isolation has been made. Notwithstanding this apparent indifference on the part of the local authorities to the contagiousness of the disease, only twenty cases have originated in Colorado Springs in twenty years."

Dr. Solly also says— to disarm a possible objection to the obvious deduction from these facts—"in the poorer lodging-houses of the town there are many ill-ventilated rooms, inside or on the north side of the building, inhabited by consumptives and their families, where recklessness of expectoration and carelessness of ordinary cleanliness are marked features of their domestic *ménage;* yet cases of contagion do not average more than one a year."

Dr. Wagner says, for his own observation: "At Davos-Platz, in Switzerland, where I spent a winter a few years ago, a very large number of consumptives were staying. The hotels were crowded, and of the fifteen hundred strangers in the village, about one thousand were consumptives. At the hotel at which I stayed there were about one hundred and twenty guests, about eighty of whom were consumptives. At Davos, during the winter, the invalid's day for outing is limited to four and one-half hours; the remainder of the twenty-four hours is spent within doors. No one stood in dread of contracting the disease, and no cases occurred in which it was conveyed from person to person. No special precautions were taken by the physicians and local authorities to prevent contagion, other than good ventilation of the living- and bed-rooms.

[1] Medical Record, February 6, 1897.

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As in Colorado Springs, no cases of the disease originated at Davos."

At the last meeting of the American Climatological Association, Dr. Vincent Bowditch, of Boston, earnestly deprecated the reckless and extravagant utterances regarding the contagiousness of pulmonary consumption, made by medical men as well as laymen in a recent discussion in the daily press, and "showed that in well-regulated hospitals or sanitaria for consumptives contagion is almost unknown, or, at least, that with ordinary cleanliness and care as to the destruction of the sputa, the danger is reduced to a minimum."[1]

Notwithstanding these facts and others that would be mere repetitions of them from equally competent authorities, a few men still manage to disturb the profession and alarm the community from time to time with exaggerated statements on this subject, overlooking the fact that present observations and historical occurrences demonstrate that consumption is not contagious (in the ordinary sense of this term) and that extreme measures of isolation and disinfection are unnecessary and useless. Two hundred years ago in places as remote as Ireland and Italy, consumption was regarded as contagious, and frantic attempts were made to limit its ravages. Naples set a custom that would hardly be emulated by our zealous American Boards of Health. In Naples and Rome it was customary to sacrifice the clothes and furniture used about the sick, and even to scrape the walls and tear down the woodwork of the chambers in which they had been sick.

The subject of the contagiousness of consumption and compulsory notification was thoroughly discussed by the College in January, 1894, and notwithstanding the labored and ingenious arguments of those devoted to the contagion theory, the conclusion of the College was that the evidence did not justify such measures as the contagionists thought to be essential to limit what they call the spread of the disease.

It is questionable, in view of what has been already stated, for one to say, without qualification, that consumption is an infectious

[1] Journal of the American Medical Association, November, 1896, p 1016.

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disease; and, as I have stated in a paper read before the Medical Society of the State of Pennsylvania, May 18, 1897,[1] those who have alarmed the world by expressing extreme views in regard to its infectiousness have committed a serious blunder, for, while observation justifies the belief that there is distinct danger that persons deprived of their liberty, with little opportunity for exercise, whose habits of life are changed, whose food may be insufficient, and who are herded with others suffering with consumption, may contract the disease from them (as shown by the statistics of convents and prisons), the malady can hardly be called infectious in a broad and general way. As Dr. Russell, of Glasgow, has said, "In the academic sense it is infectious; in the popular sense it is not;" and those who wish to secure the observation of prudent rules of health would do well to avoid those extreme pronouncements which have been made in this country and in some others, and to rather copy the careful and discreet utterances of the French Society for the Prevention of Pulmonary Phthisis and Other Forms of Tuberculosis, which, in a circular intended for general distribution, makes a statement that can be thoroughly indorsed by those who wish to do what they can to prevent the spread of this disease, namely:

"We know further that the consumptive is not in the least dangerous by contact or proximity; that it is never his body nor his breath which is hurtful; and that we can chat with him for hours, live with him for years, and even sleep in his room and give him the most constant care without running any serious risk, *provided we take certain precautions*, the chief of which is to collect his expectoration, and not to delay the destruction of his sputum until it becomes dry and is disseminated as dust in the air."

Finally, although I have just used the word "spread" in connection with this disease, I think it is well to add that consumption is not a disease that is now spreading; on the contrary, in the time covered by most accurate vital statistics of this country and Europe, it has diminished considerably in frequency. Some earnest advocates of restrictive measures have already claimed that the reductions observed within the past few years have been due to the

[1] "Comforting Facts about Consumption." Medical Age, June 10, 1897.

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attempts that have been made to restrict it by boards of health; but, fortunately, the community has a better reliance than this weak and inefficient one, and is encouraged by the knowledge that for many years there has been a comparatively steady decline in the proportion of cases of consumption. The disease is not spreading, as alarmists make the community to fear, but is actually contracting; and the hope may be entertained that, with the inculcation of reasonable and proper precautions, without spasmodic and violent measures, the ravages of consumption will become less and less, and it will soon cease to be the scourge and terror that it now is.

DISCUSSION.

DR. LAWRENCE FLICK: I would like to clear up a few misunderstandings. We should all agree upon what we mean by contagion before we attempt to discuss its application to any particular disease. Contagion means the contraction of a disease by reason of contact, according to the Latin word *contingere*, and it should apply to all diseases which are conveyed from one person to another by means of contact directly or indirectly. We must also have a clear understanding as to the methods by which the contagium is conveyed. In regard to tuberculosis, there is unfortunately an idea prevalent that the tubercle bacillus is everywhere, and this idea has done more harm than any other one factor. The most careful experiments have proven beyond doubt that the bacillus is not everywhere. The environments under which the infection of tuberculosis can take place are limited to the immediate surroundings of the persons suffering from the disease, and if we will bear this fact in mind it will be evident that the arguments against the contagion theory, made here to-night, can scarcely hold. Consumption hospitals should not be a source of infection, because a certain amount of ignorance and disregard for cleanliness must exist for infection to take place. Any well-regulated hospital has such laws of cleanliness as would prevent infection. The proper place to study this question is in the homes of the poor, where cleanliness is not observed and where the contagium is distributed about. I will not attempt to discuss this matter fully. I merely want to call attention to the fact that the arguments that have been made do not mean so much as they would appear to mean at first sight.

DR. THOMAS J. MAYS: I think if we should look into the records of any State in this country—say, New York, where the records have been kept since 1847—it will be seen that there has been a diminution from that time

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on. Probably this is not true of every year; but the average diminution has been gradual. We all know that no precautionary measures were taken on the score of contagion until 1882. I think the records of consumption hospitals count for much. If consumption is not contagious in those hospitals, where can we find places where it would be? You have the disease in the fullest sense of the term in these hospitals; you have many patients suffering from the trouble; and you have healthy persons there coming in contact with the disease day and night. All the hospital people are exposed to it, and yet the records of the Brompton Hospital show that the disease is not communicated from the sick to the healthy. In but a single instance has it been shown during the past thirty-six years that consumption has been communicated from the sick to the healthy, according to Dr. Williams. He also says that one nurse, who had the disease when she entered, improved while in the hospital. She left the hospital to do nursing outside, and soon got worse. Upon her return to the hospital she again improved. I am a believer in the non-contagiousness of this disease; and we should all be careful about exciting people on this question.

DR. DULLES: It is true that we must agree as to the terms, as Dr. Flick has said; but, in the ordinary and generally understood meaning of the word, no person who is well informed and who is exact in language will say that consumption is contagious. Dr. Flick says that he believes the homes of the poor are the best places to study this disease; and, of course, this is true; but something may be said as to the proper interpretation of statistics. I think that those who have been most ardent in the belief he holds have not sufficiently taken into account other factors, as, for example, bad food, bad air, bad habits, etc. The assertion that "any well-regulated hospital has such laws of cleanliness as would prevent infection"—if Dr. Flick means that they, as carried out, will or do prevent the careless distribution of sputum—is an error. Personal knowledge in regard to hospitals will, I think, justify the contrary statement, namely, that their laws aim at this result, but cannot be so effectively carried out as to secure it. They are undoubtedly useful, but by no means accomplish what Dr. Flick assumes that they do. There has been a general diminution in consumption for many years. This has been attributed by Dr. Flick to the working of consumption hospitals; but when we find this same thing taking place in countries that have few such hospitals, I think we must say that hospitals alone are not responsible for this reduction. The scaring of people, which is constantly being done, is a mistake. The public press has done this too much, and it leads to great harm. In the Rush Hospital we had this difficulty not long ago; the Board of Health wanted to prevent us from occupying a building in West Philadelphia. The people in the neighborhood were intensely aroused, and thought their health would be endangered and their property would be ruined. Hospitals of this kind do not in any way do harm, and in time common sense and increasing knowledge will make impossible such an unwise attitude toward them.

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LIGATURE OF THE INNOMINATE ARTERY FOR HEMORRHAGE, WITH THE REPORT OF A CASE.

By RICHARD H. HARTE, M.D.

[Read June 2, 1897.]

My desire in reporting this case to the College is because of its particular interest in illustrating the value of the use of the x-rays in locating foreign bodies, and the opening up of the subject of dealing surgically with the innominate artery, either for the cure of aneurism or for hemorrhage. I will say nothing relative to the use of the Roentgen rays, as that side of the case has been dealt with by my friend, Dr. R. G. Le Conte (and reported in the *Annals of Surgery*, August, 1896), who had charge of my wards at the Pennsylvania Hospital during my temporary absence.

History. The history of the case is briefly as follows:

E. I., colored, laborer, aged twenty-six years, was admitted to the Pennsylvania Hospital on the evening of May 31, 1896, with a pistolshot-wound of the neck. The weapon had been accidentally discharged at a distance of four feet, the bullet entering the neck on the left side about an inch above the level of the clavicle in the region of the anterior scalene muscle. The probe entered for a distance of about one and three-quarter inches toward the middle of the neck; it was there firmly arrested, and no manipulation or change in the position of the patient would advance it further. The patient was unable to move the left arm toward or away from his side, or to raise it from the bed; but he had perfect control over the forearm and hand, though his motions were slow and deliberate. There was no anæsthesia of either arm or shoulder. The act of swallowing caused severe spasmodic pain in the throat. There was no change in the voice, and the patient had no difficulty in talking.

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No attempt was made to extract the ball until it had been accurately located by a skiagraph, which was taken on the following day by Prof. Goodspeed, of the University of Pennsylvania. The ball was lodged on the right side of the neck in front of the seventh cervical vertebra.

The patient was etherized and an incision was made on the right side of the neck, behind the posterior margin of the sterno-cleido-mastoid muscle. The former was separated from the anterior scalene muscle, and the bullet was found in a small pocket of pus close beside the œsophagus and behind the carotid artery a little above its origin. The wound was flushed with water and an antiseptic dressing applied. On the third day it was noticed that fluids which the patient drank regurgitated through the wound. All feeding by the mouth was discontinued and the patient nourished by nutritive enemata. With enjoined rest, the œsophagus soon healed, and food was administered in the usual way.

On the eleventh day, July 14th, the wound in the neck suddenly began to bleed, and was controlled by packing with sterile gauze by the resident physician, Dr. Brinton. When I saw the patient the bleeding was perfectly controlled. A special nurse was ordered, who was instructed how to act in case of a recurrence of the bleeding.

July 16th, at 3 A.M., without warning, a sudden hemorrhage from the wound began. After removal of the packing the bleeding was controlled by digital pressure deep down to the bottom of the wound. On my arrival I found the patient's condition fairly good in spite of considerable loss of blood. An incision having been made in the line of the vessels, and exposing the common carotid artery, I passed a ligature around it, but was surprised to find that this did not control the bleeding; the blood continued to well up from the bottom of the wound, apparently coming from an opening on the posterior side of the vessel; thus it was impossible to locate accurately the bleeding-point. I feared the subclavian or thyroid axis might be wounded, as nothing appeared to control the bleeding but direct pressure with the finger in the wound on the side of the neck; and, feeling that I must seek a lower point to place the ligature, I dislocated the sternal end of the clavicle and turned it out, this giving me a much better opportunity to deal with the bleeding vessel, and, if necessary, to ligate the innominate. It must be remembered that at the bottom of the wound was an old abscess cavity, from which the ball had been removed, and the surgical relations were consequently much altered. Before attempting to deal with the innominate I passed another catgut ligature around the carotid a short distance above this bifurcation, which ligature completely controlled all bleeding.

All the steps of the operation were necessarily embarrassed by the fingers of my assistant in the wound and the use of artificial light. An antiseptic dressing was applied, and the patient soon reacted. In order to keep the patient quiet and induce as little movement as possible by the muscles of

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deglutition, all nutriment was given through a small stomach-tube, which was easily inserted through the nostril.

July 26th, ten days after the operation, a second hemorrhage occurred, without warning, about 3.30 A.M. I was hastily summoned, and found the patient had lost much blood and was in a poor condition. The bleeding had been controlled by digital compression.

The patient was again etherized, and the old wound in the line of the vessels reopened. It was found to be filled with plastic lymph, which obscured all surgical relations. A careful dissection, however, revealed the fact that the bleeding came from the stump of the carotid on the proximal side of the vessel. The sternal end of the clavicle was again turned out, the innominate exposed, and it was ligated with silk a short distance below its bifurcation. The right subclavian and carotid were also ligated in the same manner. The right internal jugular vein was found to be almost completely ulcerated, and ruptured under pressure. The bleeding was with difficulty controlled by a double catgut ligature.

The edges of the wound were then approximated with silkworm-gut.

During the operation the patient's condition was poor, demanding active stimulation. Failing to get much response in the way of reaction, a pint of normal salt solution was slowly thrown into the circulation through the median basilic vein, and this greatly improved the patient's condition. He was removed to the ward, but died suddenly in a few hours.

The post-mortem examination was made by the coroner's physician, and corroborated the course and position of the ball as above described; the œsophagus was ulcerated; the opening, one-quarter of an inch in diameter; ligature around innominate artery. The body of the cervical vertebra had been struck by the ball and its cancella opened; there was also some erosion of the fifth and sixth, and of the first, second, and third dorsal vertebræ on their anterior surfaces. The exact course of the bullet could not be traced, owing to adhesive inflammation.

Brain. Abscess cavity the size of a walnut was found in the anterior portion of the right temporo-sphenoidal lobe, and running into the fissure of Rolando. A transverse section through the right frontal lobe revealed another abscess cavity, smaller than the first, containing about a drachm of greenish pus. The surrounding brain tissue was not broken down. Other portions of the brain were pale, and the vessels were exsanguinated.

The abscess cavities were undoubtedly due to septic infarcts carried from the ulcerated coat of the carotid. At no time during the patient's illness did he complain of pain or show any head symptoms.

The first recorded operation for ligation of the innominate artery was that of Valentine Mott, of New York, in 1818, for an aneurism of the innominate, carotid, and subclavian arteries. The patient died from hemorrhage on the twenty-sixth day. The idea of

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ligating the innominate artery was first conceived by Allan Burns on purely anatomical grounds, for he believed that the collateral circulation would be sufficient to supply the head, neck, and upper extremity with blood.

When one examines the literature of the subject, although it is not large, and sees described some of the difficulties of technique, as recorded by Banks, he will hesitate before attempting an operation which is followed by an almost unbroken record of fatal results. The cause of death after operation is either from shock, secondary hemorrhages, usually from the distal side of the ligature, or sepsis. The operation for the ligature of the innominate artery has thus far been performed and reported, including my own case, but thirty times—in twenty-six of which ligation was accomplished for the cure of aneurism, usually of the subclavian artery, generally involving the junction of the carotid and innominate arteries, and four times it was performed for trauma. Of these four, one was for hemorrhage from the subclavian; one for hemorrhage from the axillary artery and for secondary hemorrhage following ligation of the subclavian; one for secondary hemorrhage following the ligation of the common carotid (my own case).

Of these cases four might be reported as successful, but a careful analysis will relegate some to the list of fatalities. The first successful case reported was Smythe's, of New Orleans, in 1864. The patient lived ten years, and finally died from hemorrhage from the sac of the original aneurism.

The second was Lewta's, of India, in 1889, reported cured at the end of forty-three days.

The third was Coppinger's, of Dublin, in 1893, reported cured at the end of forty-two days.

In another (Burrell's case) the patient died on the one hundred and fourth day following the operation. During that time the patient had been up and about, attending to business. The cause of death was hypertrophy and dilatation of the heart, with general arterial sclerosis.

The first case can undoubtedly be counted as a cure. The patient lived for ten years after the operation. The second and third cases had not been under observation sufficiently long to

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establish positive cures, for Graefe's case shows that death from hemorrhage may follow this operation by nearly a month. Burrell's case may be fairly counted as one of cure, so far as the operation and aneurism are concerned, for his patient lived to the one hundred and fourth day, and died of heart disease.

As a great many of these reported cases belong to the pre-antiseptic era of surgery, it may be safe to say that if they had all been dealt with in a thoroughly aseptic manner and with the employment of animal ligature the results might have been more favorable.

Ligature of the innominate artery has been so fatal an operation that it has been questioned whether the operation is a justifiable one or not. There are many men who, in a lifetime of active surgical work, have never been called upon to deal surgically with the innominate artery. In fact, so far as I am able to learn, this is the first reported case which has occurred in Philadelphia. There are times, however, when the surgeon is necessarily obliged to deal with this vessel even under the most trying circumstances, and when neglect or timidity on his part is unpardonable.

THE OPERATION. The vessel is best reached by the triangular incision (Mott's operation), consisting of a transverse incision just above the clavicle and carried to a point over the sternal notch; and a second incision of about the same length, extending from the termination of the first along the inner edge of the sterno-cleido-mastoid muscle. The triangular flap thus formed is dissected up, thus dividing the sternal attachment of the sterno-cleido-mastoid and as much of the clavicular portion as may be necessary for the exposure of the vessel. Should this not afford a satisfactory field for operation, the sternal end of the clavicle may be either removed or dislocated and rolled outward. Cooper, of California, has employed this latter method of exposing the artery, and in my own case it gave an exposure without which the operation would have been impossible. Bardenheuer has several times removed the manubrium, the sterno-clavicular articulation, and portions of the first rib in order to safely remove large tumors at the base of the neck; and he insists that a free access to the artery must be obtained in order to safely place a ligature about it. It is evident that this

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procedure permits the operator to place a ligature with a greater accuracy than when the ligature is slid down, in the dark, behind the sternum. After the vessel is exposed great care must be exercised in passing the ligature, in order not to wound some of the important tissues which are in close proximity to the innominate.

In the ligation of a vessel of the size of the innominate, the selection of a suitable ligature is of the greatest importance. Almost every variety of material has been employed, such as linen, silk, ox aorta, catgut, tendons of different animals, etc. It would seem that a ligature composed of animal substance, which would in time lend itself to the tissues and yet be sufficiently strong, would be most likely to meet with success, although there is always an element of uncertainty in the employment of such a ligature, for fear that it may become absorbed too soon or its knot become insecure through the softening processes of heat and moisture. Burrell employed two flat, braided-silk ligatures, passing one above the other about one-half an inch apart. His object was to rest the artery by severing the vessel between them, thus avoiding the tracheal tug.

In nearly all of these cases the hemorrhage has come from the distal side of the vessel or from the sac. It is unquestionably better to ligate the vessels, the carotid, or subclavian on the distal side of the aneurism, thereby cutting off as much as possible of the diseased vessel from the general blood-current.

It might be supposed that the sudden withdrawal of the circulation from the right side of the head and arm would be followed with most disastrous results; but such has not been the experience of surgeons. That it is not disastrous has been proved also by the experiments of Spencer on Macque monkeys;[1] and in monkeys arteries appear to bear the same relation to one another as in man, their relation to the surrounding parts being the same. The animals were etherized and the artery exposed by a median incision; a sterilized silk ligature used, and the carotid and subclavian tied. There was no shock. The wound healed by first intention before the animals pulled the dressing off. All that was found after the

[1] British Medical Journal, July 13, 1889.

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operation, beyond the loss of pulsation in the right carotid and right subclavian, was a disinclination on the part of two monkeys to use the right upper limb for some time, although it appeared to be as strong as the left and as warm. The animals were killed in five, ten, and twelve weeks respectively after the operation. The first was injected. The anastomosis was found to be complete, and, as it happened, the right upper limb was better injected than the left. The results on all these animals were identical.

In another case the method was varied by using a sterilized catgut ligature. Only the innominate was tied, not the carotid or subclavian. The animal died on the seventh day from hemorrhage. The ligature had perfectly occluded the innominate on the proximal side; there was a small hole on the distal side opposite the bifurcation, and both carotid and subclavian were patent—the exact condition of so many cases which have resulted fatally after operation.

It has been asserted that as animals differ so much from men these experiments are not conclusive. Nevertheless, the experiments are very instructive, showing as they do that the operation may be performed without much shock, and that when the vessels are healthy the collateral circulation is soon re-established.

	Cardiac side.	*Distal side.*
Trunk	First aortic intercostal	with superior intercostal of subclavian.
	Upper aortic intercostals	with thoracic branch of axillary and intercostals of internal mammary.
	Phrenic	with musculo-phrenic of internal mammary.
	Deep epigastric . . .	with superior epigastric of internal mammary.
Head	Free communication of vertebrals and internal carotids of opposite sides inside the skull. Communication of branches of opposite external carotids in median line of neck and face.[1]	

In nearly all the operations that have been performed heretofore the patients have suffered from some constitutional disease which has affected the coats of the bloodvessels, rendering them unable to withstand the increased demands thus made on them.

The position of the innominate, with its close proximity to the heart, the shortness of its trunk, the force of the circulation to

[1] Sir William MacCormac: Ligature of Arteries, p. 75.

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which it is subjected, the evil effects of disturbing the cellular connections which link together so many important structures in the cervico-thoracic line, and the uniform fatality of the operation are undoubtedly factors, all of which should be carefully considered in attempting to deal directly with the innominate for the cure of aneurism. It would seem, in the light of present experience, that Basedow's operation of tying the carotid and subclavian seems to be the most promising method of procedure, although in a case of my own at the Episcopal Hospital the patient died suddenly from syncope about an hour after the tying of the vessels—a result apparently due to too much back pressure upon the heart. As I have before stated, I cannot help thinking that, in the light of modern surgery, in the next series of thirty cases of ligation of the innominate artery the results obtained will be much more favorable. Nevertheless, this procedure will always be an extraordinary operation, and one fraught with danger.

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A CASE OF OBSCURE DIAGNOSIS EXHIBITING HYSTERIC STIGMATA.

By AUGUSTUS A. ESHNER, M.D.,
PROFESSOR OF CLINICAL MEDICINE IN THE PHILADELPHIA POLYCLINIC; PHYSICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

[Read October 6, 1897.]

C. H. W., forty-five years old, presented himself at the Orthopedic Hospital and Infirmary for Nervous Diseases on May 7, 1897, in the service of Dr. S. Weir Mitchell, when the following history was obtained:

His father was living, at the age of seventy-six years, in fairly good health. His mother had died, past the age of sixty years, suffering from some ocular disorder. One sister had died in infancy, and three brothers and one sister were well. There was no neurotic heredity.

The man had been married twenty-three years and had ten children, the oldest being twenty-one and the youngest two and one-half years. There had been one stillborn child. The patient denied all venereal disease. He had used tobacco and alcohol in moderation. He was accustomed to take one cup of tea and two cups of coffee daily. Other than two falls, during the progress of the condition for which he applied, he had suffered no traumatism.

The patient related that on February 26, 1897, while putting coal on the fire, he was seized with vertigo and fell upon the stove, without, however, suffering any physical injury. So far as could be determined, the vertigo was objective in character, and the man was obliged to sit down. He was at once seized with vomiting and hiccough, which continued almost uninterruptedly for forty-eight hours. The vomiting took place both following the ingestion of liquids and solids and independently thereof. The vomited matters were said to be dark in color and of a bad odor, like that of "gas." According to the statement of the wife, the patient had a mild tonic convulsion, with frothing at the mouth, on the morning of the day following the onset of his symptoms. Concerning this attack he relates that he knew what was going on about him, although unable to speak.

The physician first called failed to relieve the vomiting. A second, who

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was summoned on the third day, was at once successful in this connection. He diagnosticated "gastritis." Improvement set in and continued for two weeks, when, on attempting to get out of bed, the patient found difficulty in using the extremities upon the right side in consequence of weakness. At this time, also, on going to sleep, he became conscious of a peculiar sensation, beginning at the feet, ascending to the trunk, and awakening him with a sense of marked vertigo, surrounding bodies appearing to engage in active movement. These manifestations had occurred nightly, and also during the day on going to sleep. According to the wife's statement, the patient had also at these times twitching in the arms. On sudden, rotatory movement of the head he would be seized with vertigo and a sense of weakness, and in walking he felt impelled toward the left side. There were no abnormal auditory phenomena.

The patient was easily annoyed and frightened, but there was no tendency to undue or unprovoked laughter or crying. Toward evening he had noticed some stiffness of the right side of the neck, which disappeared when he retired to bed. There was no headache, and sleep and appetite and digestion were good. The bowels were constipated. There was no nausea, no vomiting, and no cough. There was considerable mucous expectoration, the throat at times being choked up with secretion. There was no vesical or rectal difficulty. The man had lost some money, his business had been bad, his income small, and his family large.

The gait was somewhat ataxic, and, according to the patient, it was worse on first arising from the sitting posture. Station was unsteady when the eyes were closed and the feet brought in juxtaposition, but was better maintained when equilibrium was once established. It was scarcely less poor with the eyes closed than when they were open. The knee-jerks were active, and abortive ankle-clonus was present on the left. The reflexes in the upper extremities were active. The dynamometric record was 140 on the right, 130 on the left. Sensibility was impaired on the entire right side of the body, up to the median line, alike to touch, to pain, and to temperature. The palpebral fissure and the pupil appeared smaller on the left than on the right. Both pupils reacted to light and both eyeballs exhibited rotatory nystagmus. The action of the heart was rhythmic, its sounds clear and ringing.

Examination of the eyes by Dr. A. G. Thomson confirmed the existence of rotatory nystagmus, and he reported further that the pupils were small, but reacting normally, the left being smaller than the right. The disk and fundus were apparently normal in both eyes. There was hypermetropia of two dioptres. Movement of the left eye upward was defective, in consequence of paresis of the superior rectus. When a large condensing lens was placed before the left eye there was developed vertical diplopia, the images appearing a foot apart at a distance of three metres. The visual fields exhibited no abnormality. Dr. G. E. de Schweinitz also examined

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the eyes, and, in addition to the foregoing findings, noted the existence of homonymous diplopia, most marked in the lower field. There was, however, no limitation in the rotation of either eyeball.

Under date of May 14th it is noted that the patient had a vertiginous attack, while riding in the car, just before coming to the clinic. During the attack he felt as if he were losing power, and he had a sense of fear of falling. He cried out, and seemed not to be able to see. There was no loss of consciousness and no convulsive movement, but objects appeared to revolve about the patient. This form of attack was distinct from that which occurred on going to sleep. The attacks were sometimes induced by looking at quickly moving objects or at a high building.

Hypnosis was attempted at the patient's first visit, but was not successful. A second attempt was more successful. In this the patient was seized with vertigo and seemed disposed to fall from the chair, but was restrained by command. Toward the close of the séance he suffered from objective vertigo, following which, however, he was able to arise and walk. Improvement soon became noticeable, and by the advice of Dr. Thomson the right eye was covered with a blinder. The attacks gradually diminished in frequency and severity, and later occurred only on removal of the blinder. The latter becoming lost, the patient was thought to be slightly worse for a time, but he soon again improved, and subsequently had little or no difficulty, even when one eye was not covered.

A note made August 20th states that the patient had improved steadily except as to walking, there being some weakness of the right leg and inability to walk with certainty and stability. Mucus still collected in the throat. There had been no attacks for three or four weeks, and the eyesight felt improved, but there was still a tendency to diplopia. The dynamometric record was now 165 on the right and 145 on the left. Hemihypalgesia upon the right side was still present, though not so pronounced as it had been. The patient was so much improved that he was able to engage in light work for two or three hours a day.

In addition to repeated hypnotism the treatment included also administration of compound asafœtida pills and strychnine sulphate, gr. $\frac{1}{30}$, and later of potassium iodide, 10 grains, gradually increased to 18 grains, three times a day.

On October 1st the patient was still doing well, occupying himself with his work about four hours each day and walking a good deal. He used a cane for support and guidance, stating that without it he staggered a little. The gait appeared merely a little awkward, but not at all distinctive; it was not appreciably made worse when the eyes were closed. Station was quite steady, withal a little uncertain. In walking the patient felt a sense of swaying to right or to left, but to one side scarcely more than to the other.

He had had, some days before this examination, a slight vertiginous attack after making an effort to reach a car. The alarming attacks that for-

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merly occurred at night had entirely disappeared. The knee-jerks were normal and approximately equal. No ankle-clonus could be elicited. There was still diminished sensibility over the entire right side of the body. There was increased desire to urinate, especially at night, but control of the sphincters was perfect. Mucus still accumulated in the throat and occasioned rather copious expectoration. Speaking readily induced a sense of exhaustion. The dynamometric record was 155 on the right and 160 and 145 on the left. The action of the heart was rapid and rhythmic; the sounds were wanting in vigor. The rotatory nystagmus appeared to be not so marked as it had been, the eyes twisting upon their axes only when moved voluntarily. The urine, examined on October 4th, was acid in reaction, with a specific gravity of 1025, and was free from albumin and sugar.

Under date of October 5th, Dr. Thomson reports vision (with glasses) to equal 6/xxx in the right and 6/xx in the left eye. There is a high hypermetropic refractive defect. Diplopia is developed with the aid of a red glass. The right eye has been amblyopic for many years. There is torsion movement of the eyeballs not due to a paretic muscle. There is no change in the fundus. The patient escapes the discomforts of diplopia by virtually suppressing the image of the badly seeing right eye. Electric examination, on October 6th, by Dr. J. H. Rhein, disclosed no changes in the reactions and no diminution in electro-sensibility.

This case is of more than ordinary interest by reason of the obscurity that surrounds its complete diagnosis, and it illustrates one of the many complicated phases that hysteria may assume. Of the existence of hysteria there can be no reasonable doubt. The mode of onset, the character of the symptoms, the paroxysmal phenomena, the sensory derangement, and finally the improvement following hypnotism and suggestion are all significant in this connection. Beside, the individuality of the patient himself makes an impression upon the observer that no description can adequately convey. The further question, however, as to the existence or not of an organic lesion is not so readily disposed of. We are thus confronted with the danger on the one hand of mistaking as hysteric possible symptoms of organic disease, and on the other hand, of ignoring in the face of symptoms of organic disease the co-existence of hysteria. The problem for solution then is, Is the case before us one of hysteria pure and simple, one of organic disease pure and simple, or finally, one of organic disease and hysteria in combination? It is recognized that the association last named may

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occur, and I am of the opinion that the existence of organic disease rather predisposes to the development of hysteria, while the presence of hysteria confers no immunity to organic disease.

The vomiting, the vertigo, the staggering gait, the impulsion to one side, the nystagmus are all strongly suggestive of cerebellar disease, of the existence of which the state of the reflexes (unequal and variable) might be considered confirmatory. The suddenness of onset and the convulsive seizure might be attributed to an acute lesion like hemorrhage, but it is well known that more chronic affections like tumor or abscess or aneurism may for a variable length of time pursue a latent course and eventually give rise to acute symptoms. It may be accepted as a fact that there is scarcely any organic condition whose symptoms hysteria may not reproduce, and it is, therefore, not impossible that the symptoms specified may be expressions of the hysteric state.

The hemihypalgesia, further, requires other explanation than a cerebellar lesion; while its recession, together with that of the remaining symptoms, does not well comport with the existence of organic disease of any kind. The ocular manifestations afford perhaps the greatest difficulty in the way of explanation. While these may be referable to intracranial disease, there is reason to think that, in part at least, they antedated the present condition, inasmuch as the patient himself believes the left eye, which he appreciates is the better-seeing one, to have always been smaller than the right. Both eyes, in fact, appear to be diminutive, and if this abnormality be congenital, or acquired in early life, it may bear a distinct relation to the nystagmus, and, perhaps, also to the paresis of the superior rectus of the left eye. It may, therefore, be concluded that while the evidence is hardly sufficient to justify an absolute denial of the existence of organic disease, it is, likewise, not sufficient to justify insistence upon its presence.

DISCUSSION.

DR. THOMAS R. NEILSON asked if there was any sign of ear disease, and the President asked if there was any record of the patient's temperature, both of which questions were answered in the negative by Dr. Eshner.

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DR. CHARLES W. BURR: I have listened to the paper with much interest, and I suppose one who has not seen the patient should not criticise the opinion of one who has studied the case so carefully; but it seems to me that organic disease explains the symptoms better than hysteria. Apoplexy would explain the whole case. The patient's susceptibility to hypnotism is interesting. In organic brain disease, and especially in vascular disease, such as occurs in nephritis, vertigo and indeed unconsciousness from fixation of the eyes are more readily produced than in healthy men. Hysteria hardly explains all this man's symptoms.

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TWO CASES ILLUSTRATING SOME DEFECTS OF VOICE AND SPEECH, AND THEIR TREATMENT.

By G. HUDSON MAKUEN, M.D.,
PROFESSOR OF DEFECTS OF SPEECH AT THE PHILADELPHIA POLYCLINIC; LARYNGOLOGIST TO ST. MARY'S HOSPITAL.

[Exhibited October 6, 1897.]

I WISH to show the results of treatment in two cases—one of defective speech and one of defective voice.

The first case is a woman who has been a severe stammerer for thirty years. She illustrated nearly all the different forms of stammering, and she suffered as a result nearly all the ills that woman is heir to. She was a "wreck," to use her own expression, both mentally and physically; and she now attributes all her trouble to the fact that she did not know how to talk or breathe. Comparatively few women stammer; but the stammering woman suffers far more than the stammering man, for the woman, as a rule, regards fluent speech as a kind of birthright.

This patient tried many of the so-called "cures" for stammering, both in this city and in New York, but with very poor success and with no permanent improvement whatever. When she came to my clinic, about eight months ago, I found the cause to be a lack of respiratory control. The expiratory effort which belongs essentially to the act of vocalization was especially at fault; and a very short time was sufficient not only to explain to her the condition, but to enable her to correct it. She has not stammered since her third visit, and she will now show you with what ease she can speak, and she will tell you that she has no fear of a relapse. No one can be said to be cured until a certain degree of confidence has been acquired. (The patient then gave a little explanation of her case, and answered several questions with perfect freedom of speech).

The second case is a young man, aged seventeen years, who was referred to me by Dr. Max Thorner, of Cincinnati. At the age of thirteen he had

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an attack of typhoid pneumonia, and at fourteen a second attack. During convalescence his vocal organs underwent the natural change which takes place at puberty, but owing to his weakened physical condition he was unable to make the necessary changes in the muscular adjustments of the larynx. The result is that for the following three years his voice has been a combination of the aspirate with the falsetto quality, and it has been with great difficulty that he could speak at all or be heard when he did speak. I will ask him now to illustrate this very peculiar style of speaking and also to show you his new and improved voice.

(Patient exhibited both modes of phonation).

The condition here was simply a lack of control of the extrinsic laryngeal muscles. The stylo-hyoid and the palato-pharyngeus muscles contracted firmly during every attempt at vocal utterance, and the result was a strong up-lifting of the larynx. This lack of muscular balance and the resulting high position of the larynx interfered with the proper adjustments of the vocal cords and the various so-called resonators of the voice, and the result was the high, broken falsetto, instead of the low, smooth chest tone which naturally belongs to a boy of his age and physique, and which he can now give so well.

The cause of this defective voice may be traced, then, to his illness at the time of puberty, and also to the fact that his friends at home made fun of his squeaky voice, and he became nervous and anxious about it.

The defect was easily remedied. The indications were to counteract the up-pulling of the larynx, by developing the use of those muscles which hold the larynx down, viz., the sterno-thyroid and sterno-hyoid. It was not so much the over-action of the up-pulling, as the under-action of the down-pulling muscles, which caused the trouble. At first I held the larynx down for him with my finger placed in the notch on the upper border of the thyroid cartilage, and in a few days he was able to acquire voluntary control over these opposing muscles, and to so fix the larynx firmly against the cervical vertebræ as to bring into vibration those portions of the body which give what is known as the chest-voice.

I have had several somewhat similar cases, although they all believed the voice they used to be the correct one. This boy appreciated the seriousness of the defect, and spent three years of

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great anxiety with reference to his condition, which he feared might be permanent. He now speaks in his natural voice, which is exceptionally good, as you have heard, though he has been using it only ten days.

DISCUSSION.

DR. JOHN K. MITCHELL: I can bear testimony to the success of Dr. Makuen in this work. I have sent several cases to his clinic, although probably he does not know it. In several cases that I have undertaken to instruct, where there was some defect of speech, I have employed moderate constriction of the chest in order to call their attention by the tightening of the belt to whether they were filling the chest before talking. I have tried this only twice, but the patients tell me it has helped them as a reminder.

DR. F. SAVARY PEARCE: I would like to ask Dr. Makuen if he does not think that young boys singing in choirs often injure their voices.

DR. MAKUEN: Growing boys singing in choirs almost always injure their voices by overtaxing them. No boy should be allowed to sing, of course, during the period of special laryngeal development at puberty.

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SPECIMEN FROM A CASE OF FOLLICULITIS NUCHÆ SCLEROTISANS (ACNE-KELOID).

By ARTHUR VAN HARLINGEN, M.D.

[Read November 3, 1897.]

The specimen I present was taken from a young negro, Henry M., who came under my care at the Polyclinic several years ago.

The affection was of between three and four years' duration, having begun as a small, hard pimple in the border of the scalp above the nucha. New pimples of a pin-head size at first, but slowly increasing in volume, were added to the first lesion until a hard, elevated tumor developed. At this stage the patient sought relief at the Pennsylvania Hospital, when the tumor was at first supposed to be a nævus, and later was diagnosticated keloid, and was cut out.

About a year subsequently, when I saw the patient, recurrence had taken place, the tumor, which was situated on the back of the neck, having attained the size of half a hen's egg. In appearance it was hard, smooth, firm to the touch, and showing many of the characteristics of ordinary keloid. In addition, however, there were several small nodules and purulent deposits where these had softened, opening out upon the surface. The surface of the tumor was nearly denuded of hairs; those which remained were for the most part dried, twisted, and atrophied. At several points a number of hairs emerged in a brush-like form from a single glandular opening, and this was perhaps the most striking feature of the disease. (It can be seen on the specimen which I now present.)

The tumor was excised by Dr. T. S. K. Morton, a large sweep of the knife being employed so as to include all the tissue which might by any possibility be involved in the growth. A portion of the tumor thus removed was submitted to my friend, Dr. J. P. Crozer Griffith, who gave me the accompanying report of the microscopic appearances presented:

The tumor springs abruptly from the skin, and its edges are overhanging, like a fungoid growth. It is quite firm and smooth. Its length is about two and one-eighth inches, breadth one and five-eighth inches, height at highest part one-half inch. It is of a dull, gray-black color on the surface, mottled

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with oval white patches of one-eighth to one-quarter inches in diameter. Hairs spring from the surface here and there; sometimes singly, but oftener in tufts of two or three up to ten or more. Nearly all the white areas have a softened place in the centre, which, as a rule, does not penetrate to more than a minute distance below the surface. From nearly all of the white areas tufts of hair spring. Very few hairs start from the tissue at other parts than at the white areas.

On section, the growth is seen to be of a pinkish-white color, the black being merely the thickness of the epidermis. The hairs appear to run through the tumor to its very base. This section is hard and evidently fibrous. In some parts softened areas run from the surface some distance into the growth, and appear to contain pus.

Microscopic sections were made through the whole thickness of the tumor, and included a portion of the healthy tissue at one side. Some were stained with alum-carmine; others double stained with this and indigo-carmine.

The adjacent skin showed itself normal in every particular. The covering of the tumor consisted of an epithelial layer, which, down to and including the pigment layer, exhibited for the most part nothing differing from the appearance of healthy skin. Only at certain portions, where there was a large accumulation of small cells in the subjacent tissue, was the epithelial layer absent, appearing to have been infiltrated and finally supplanted by the cellular growth. Comparison with the tumor *en masse* shows that these portions correspond to the white areas mentioned. They are evidently nests of sarcomatous cells. Other of these places are seen to consist of similar nests in which softening has taken place at the surface, since there is a distinct cup-shaped depression. No débris of cells can be seen, and it is probable that any such have fallen away in process of preparing the section. In one place in the epithelium, however, the opening of a distinct abscess-cavity is visible.

Examination of the body of the growth shows it to be composed of connective tissue having the characters of a hard fibroma. It is but poorly supplied with bloodvessels, the walls of which are distinctly thickened. There is no proliferating endarteritis visible. Here and there are scattered irregularly shaped nests of cells. These are much more numerous toward the epithelial surface, but are by no means confined to this portion. The largest nests, quite visible to the naked eye, are close to the epithelium, as already stated. Under a higher power the nests of cells are seen to have no definite arrangement, like that of a carcinoma, with any distinct, sharply defined boundary. Oftener there is a diffuse infiltration of the fibrous tissue by the cellular growth. The cells are in some places decidedly epithelioid in appearance, although in others they are typically those of a small-celled sarcoma. Among and around the cells is often a very delicate connective tissue; and sometimes the presence of distinctly spindle-shaped cells gives the appearance of an alveolar sarcoma. In some places there are groups of

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very small brightly stained cells, resembling an inflammatory exudate. It is very probable that suppuration is about to take place in such spots.

The springing of tufts of hair, for the most part from sarcomatous areas situated near the surface, suggests some intimate association between the hair-follicles and the cellular growth, especially as the cells seem in some places to have infiltrated the hair-follicle. Deeper in the tumor no such association seems to obtain. In one place, however, a narrow abscess cavity, probably three-quarters of an inch deep, follows the course of a hair-follicle into and nearly through the entire thickness of the growth. Sarcomatous tissue is present around the periphery, but next to the cavity itself there is an extensive infiltration of smaller (inflammatory?) cells, while in the abscess there is much broken-down tissue and granular débris. Micrococci are present here, as shown by Gram's method.

The affection of which this specimen is an illustration, while not very uncommon, possesses a threefold interest—from the points of view of diagnosis, of pathology, and of treatment. Most cases fall into the hands of the surgeon, and at the period of full development. The minute papular nodules have then developed, and the proliferation of connective tissue has taken place to such an extent that the keloidal element is prominent. The disease, therefore, is usually supposed to be a simple keloidal tumor, and is excised as such without any minute examination. The relapse which almost invariably takes place is credited to the nature of the disease as a keloid, and is supposed to be in the ordinary course of things.

A careful examination of these tumors will, however, demonstrate their origin in an inflammation of the hair-follicles—a folliculitis. Around the periphery of the keloidal tumor can usually be seen a number of firm, pin-head or somewhat larger-sized nodules, from the centre of each of which protrudes a hair. These primitive lesions, together with the multiple abscesses and the occasional tufts of hair emerging from a common follicular orifice, are quite characteristic of the affection we are considering, and should serve to distinguish it from ordinary keloid, which is so often met with, especially in the negro, in this locality.

The pathology of *folliculitis nuchæ sclerotisans* has as yet not been accurately determined. Dr. Griffith's examination was made some years ago, and indicates the existence of sarcomatous tissue. This is also the conclusion of Follin and Langhans.[1] Unna[2] says

[1] Virchow's Archiv, Bd. xl., S. 332.

[2] Histopathology of the Skin.

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that the affection is not a combination of acne with keloid, as the original designation would seem to imply, but is a peculiar, probably infectious, folliculitis, localized in the neck, which leads to the development of a fibroma of keloid character. Ehrmann,[1] whose designation, "folliculitis nuchæ sclerotisans," I have adopted, defines the affection as a folliculitis of the hair-sac, or sycosis, induced by staphylococci and leading to a deeply penetrating sclerosive inflammation of the skin of the neck, because the hair-follicle in consequence of its anatomical structure is deeply situated in the subcutaneous connective tissue.

Secchi,[2] the most recent investigator, has observed blastomycetes in the lesions of the affection under consideration, which are identical with those artificially produced by Saalfeld, and which have also been found by Roncali in malignant tumors.

Although it seems as if the pathology of *folliculitis nuchæ sclerotisans* were in a very much undetermined condition, yet enough is known to make a different treatment from that at present ordinarily pursued desirable. The operation with the knife is undesirable, because it is not possible to extirpate the entire disease. Even if the tumor is removed with a wide margin, there must, in most cases, remain certain outlying foci of disease from which the process may again develop.

The proper treatment is the destruction of all affected parts by the electro-cautery; and especial care should be taken to search the neighborhood and to cauterize all outlying hair-follicles that show the slightest tendency to morbid action. By this means I have succeeded in curing several cases in the incipient stage, and I would recommend the electro-cautery even in those large tumors which seem to call for the knife, using the cautery as an adjunct to the knife.

DISCUSSION.

DR. HENRY W. STELWAGON: I have had an opportunity during the past fifteen or twenty years of seeing several cases of this disease, in which the symptoms were essentially those described by Dr. Van Harlingen. The

[1] Archiv f. Derm. u. Syph., Bd. xxxii., S. 323.
[2] Monatshefte f Prakt. Derm., November 15, 1896.

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condition seems just as common in the white race as in the colored. In the colored race there is apparently a more decided tendency to the keloidal element. In the several cases in white people coming under my observation, the eruption was in the early stage distinctly of a sycosiform character. Sometimes there is a good deal of underlying suppuration. I have had no experience with Dr. Van Harlingen's method of treatment; my usual plan has been thorough depilation of the parts, together with the application of some antiseptic. Decided improvement usually follows, but a permanent cure has rarely resulted.

DR. MILTON B. HARTZELL: It is a question whether this is not simply a folliculitis occurring in a subject predisposed to keloid. The disease is most common, in this country at least, in the negro, and keloid is particularly apt to occur in this race from any traumatism. Recently a case has been reported of sycosis occurring in connection with this disease, in other words, folliculitis occurring in another situation. In view of the fact that the growth resembles keloid it seems to me that the treatment suggested—*i. e.*, excision, is unusual, as excision of keloid is rarely attended with beneficial results. Whether a return is apt to follow the use of the cautery, I do not know; but excision is scarcely indicated in this disease.

DR. J. A. SCOTT: Since Dr. Van Harlingen read his paper it has occurred to me that I was a resident at the Pennsylvania Hospital during this patient's stay there, and I am positive that what was then thought to be a keloidal growth was very thoroughly removed by ligation.

DR. VAN HARLINGEN: My principal object in bringing this tumor before the College was in order that the surgeons should examine more closely and see if some cure could not be found other than the knife. This tumor was operated on very thoroughly, as you will see by its present outline. I think the knife is the worst treatment for tumors of this sort, and I believe they will be found to be of a more malignant character than has been supposed. I think the knife conveys the disease to new places.

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X-RAY PATHOLOGY OF FRACTURES ABOUT THE ELBOW.

By JOHN B. DEAVER, M.D.,
SURGEON-IN-CHIEF, GERMAN HOSPITAL.

[Read December 1, 1897.]

It is with great pleasure that I am able this evening to present a few remarks on the subject of x-ray pathology of fractures about the elbow-joint. In making this report I beg to say that this is only a small part of the work which has been done in this line at the German Hospital by Mr. Wilbert, the druggist at this institution, who favors me this evening by showing the pictures. For upward of a year it has been the practice at the German Hospital to refer all doubtful or dubious cases of injury to the x-ray laboratory, not with a view of making a diagnosis—for this, in the majority of cases, can and should be done by the surgeon's sense of touch—but with a view of confirming the diagnosis already made or clearing up definitely the direction or extent of the fracture. That the sense of touch is sometimes misleading we readily admit, but this should not deter the surgeon from examining his patient and making the diagnosis before submitting him to the x-ray, and, if he finds himself to be mistaken, he will have an opportunity of observing more correctly in the future. I would not have you understand that I believe that x-ray photography in injuries of bones is to supplant the diagnostic ability of the surgeon, but is simply offered as an assistance and further aid in this interesting and most important class of cases. Again, I feel sure that these pictures require most careful study in order that they may not

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mislead. That much light may be thrown upon the subject, and that the pathology of these injuries must be revised as a result of these investigations, there is no doubt. There is danger in absolute dependence upon the x-ray in the diagnosis of fracture, due to the number of factors which necessarily enter into the taking of a radiograph—*e. g.*, relative position of the source of rays, the object, and the fluorescent screen or photographic plate, as will be illustrated by a diagram; also by applications and dressings—*e. g.*, mercury and belladonna ointment, either of which may make the picture indistinct and distorted.

Since the beginning of the present year we have made and tabulated upward of 700 radiographic exposures, and, while this does not represent more than 500 patients, still the result has been of such an interesting and valuable character that we feel ourselves in a position to report at least some of our results. In this connection it is satisfactory to state that in all of these cases there has not been an accident or single complaint from a patient as a result of the handling of the injured or diseased member.

Furthermore, I may be permitted to say that the x-ray study is not confined to bone injuries alone, but cases of foreign body, aneurisms, bone diseases, such as osteosarcoma, etc. The x-ray laboratory in our hospital would afford ample opportunity for students to gain valuable information if studied in connection with osteology and the injuries and diseases themselves. Again, the knowledge gained by this means has enabled me to resort to operative procedures, which will receive mention as the views are shown, and which have been followed by benefit that probably would not have resulted from our former means of disposing of these cases.

As to treatment, in general, of these injuries, it has suggested but little change. From the medico-legal standpoint I should not favor admitting x-ray evidence, as the subject is still in its infancy; therefore, much is to be learned and relearned, to say nothing about the mechanical process itself being further improved.

The advantages offered the patient by radiography are: the elimination of doubt in suspected fracture and the consequent short duration of the treatment; the discovery of otherwise obscure or in-

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complete fractures which, if not recognized and treated accordingly, will be followed by excessive callous formation, possibly resulting in partial or complete anchylosis.

It might be a matter of interest to note that most of the rare fractures to be shown are the results of bicycle accidents, as one of longitudinal fracture of the olecranon, one of fracture of the head of the radius, one of fracture of the coronoid process, and the only case of lateral dislocation of the elbow.

In going over the literature of certain of these injuries, as, for example, fracture of the coronoid process of the ulna and of the head of the radius, I find that Ashhurst, in the last edition of his *Principles and Practice of Surgery*, has collected twenty cases of fracture of the coronoid process which were diagnosed during life, none of which were confirmed by dissection. Ashhurst also states that only three of nine specimens described by authors appear to give satisfactory evidence of the existence of fracture.

W. Gifford Nash, F.R.C.S. Eng. (*Lancet*, November 13, 1897, p. 1242), reports three cases of fractured coronoid process. No radiograph. All three were boys under thirteen years, having backward luxation, easily reduced, but apt to recur.

R. S. Charsley (*Lancet*, August 10, 1895, p. 331) reports a case in which there was an injury to the elbow by falling with all the weight upon the hand. The right elbow was very painful. He found, when grasping the lower end of the humerus in one hand and the forearm in the other, the latter being brought to a right angle with the former, a very slight amount of backward pressure produced a backward dislocation of the joint, the olecranon projecting considerably behind the humerus, and that when the pressure was reversed the joint slipped back into its place with the greatest ease. He could not account for these symptoms except by supposing that the coronoid process had become separated from the ulna by the fall on the outstretched hand.

It is interesting to observe that in all the radiographs of fractures about the elbow we have taken, but one of T-fracture has been met with. All the text-books upon surgery describe such a fracture, but do not speak of it as being rare. From our studies in this line of work we would say that this is not a very common fracture.

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Several of the pictures to be shown will demonstrate that in children up to the age of fourteen years the coronoid process is only partially or not at all developed. We know that this process is not developed from a separate centre of ossification, but from the same centre as that for the shaft of the ulna.

With a properly taken x-ray picture, coupled with what we learn from careful anatomical survey and physical examination of the injured member, we are placed in a position to be better able to speak definitely as to the minuteness of the injury. Therefore, to say the least, our prognosis can be rendered more intelligently, and the treatment more skilfully and satisfactorily carried out.

The following is a list of the pictures of elbow injuries shown :

Diagram.	To illustrate the importance of knowing conditions under which radiograph is made.
413. Fœtal elbow.	To show development of joint.
678. Normal elbow (11 years old).	To show development.
56. Normal elbow, adult.	To show anatomy.
591. Normal elbow, adult, side view.	To show anatomy.
405. Backward luxation (recurred).	To show absence of fracture.
198. Superior condyloid fracture.	
343. Fracture of coronoid process.	
344. Same case, antero-posterior.	To show absence of fracture of radius.
575. Fracture of head of radius. Portion of the same removed.	
222. Split fracture of radius.	
679. Backward luxation.	Fracture of olecranon.
685. Same case after reduction.	Showing fracture of internal and external condyle.
98. Fracture of olecranon, simple.	No displacement.
332. Fracture of olecranon, comminuted.	No displacement.
542. Longitudinal fracture of olecranon.	
403. Fracture of internal condyle.	
487. Fracture of external condyle.	
634. Fracture of external condyle.	
378. Fracture of external condyle.	Showing lateral luxation of forearm.
518. Fracture of external condyle.	Displacement upward and outward of fragments.
283. Fracture through both condyles.	

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504 and 505. Fracture of external condyles and unreduced backward luxation.	Operation, removal of callus; good result.
434 and 435. Fracture external condyle (boy 11 years).	Shows method of dressing.
566 and 567. Old fracture of external condyle.	Treated in extended position.
477 and 478. Old fracture of external condyle.	Showing displacement of forearm on humerus.
333. Old fracture of external condyle.	Result shows value of persistent passive motion.

DISCUSSION.

DR. JOHN ASHHURST, JR.: I was very glad to hear Dr. Deaver say what he did in regard to the X-ray pictures—namely, that we should not rely upon them implicitly. For example, they do not show depth, nor, when showing a foreign body in a bone, do they show whether it is in front, behind, or in the middle; to ascertain which point, it is necessary to have several pictures taken from different positions. In some cases of fracture you can place the bone so that the deformity will not appear, and it has been found, on the other hand, that a normal bone may be so placed that it will suggest the presence of fracture. Several pictures should be taken, from different points of view, in all cases.

Dr. Deaver is conservative and judicious in his statement that the pictures are of value in confirming rather than in making a diagnosis. They are of advantage, also, in that they sometimes show very clearly lesions, specimens of which are very rare. Thus, I have a beautiful X-ray picture of a green-stick fracture of the forearm in a child, an injury which never proves fatal, and specimens of which are therefore seldom met with. With regard to the T-fracture, I think Dr. Deaver gave the impression that its horizontal branch was absolutely transverse, but I think that the term is used to imply merely that the fracture, in a general way, resembles the capital T. Such a fracture as Dr. Deaver himself has shown, in which the condyles are separated both from the shaft of the bone and from each other, making three fragments, is really, I think, one variety of the T-fracture. It is, no doubt, a somewhat rare form of injury, but there are specimens which prove the fact of its occurrence.

DR. DEAVER: Dr. Ashhurst's explanation of a T-fracture is as I understand it. As to showing depth, we are able to demonstrate this definitely by triangulation—*i. e.*, showing one position direct and the other at an angle.

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A STUDY OF THE BLIND.

AN ANALYSIS OF 180 PUPILS AT THE PENNSYLVANIA INSTITUTION FOR THE INSTRUCTION OF THE BLIND.

By F. SAVARY PEARCE, M.D.,
INSTRUCTOR IN PHYSICAL DIAGNOSIS, UNIVERSITY OF PENNSYLVANIA; CHIEF OF THE MEDICAL DISPENSARY OF ST. AGNES' HOSPITAL, PHILADELPHIA.

[Read December 1, 1897]

In taking up this work of classification of the physical and mental characteristics of the blind, one cannot hope to draw fast lines between them and those of persons with normal vision, especially when we remember that the word blind is used in the broad sense of markedly restricted power of vision due to central or peripheral disease of the visual apparatus; and that the totally blind individual is in the minority, while the congenitally totally blind person is but rarely seen. A study of these same characteristics in adults with no light-perception dating back to birth would no doubt reveal mental phenomena that are clearly distinct from those of healthy people of normal vision. For example, could they have visual hallucinations? Dr. S. Weir Mitchell has suggested the possibility of such being aroused by drugs known to produce visual hallucinations in the seeing.[1]

We will endeavor in this analysis, however, to point out the general trend of the influence of limitation of sight upon the human being, and to express some thoughts that have been led up to in the study by tabulation, then of the subject as a whole as it presented during the past eight months that the examinations have been made.

[1] British Medical Journal, December 5, 1896.

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It was at the desire of Mr. Edward E. Allen, Principal of the Institution, who wished to secure vital statistics[1] of the blind, and through the kindness of Dr. Charles A. Oliver, who suggested the writer, that this study was undertaken.

ETIOLOGY.[2] Causation of blindness of the class of patients received into the Institution is given in the valuable paper of Dr. George C. Harlan as long ago as 1873, when 167 pupils were reported[3] upon. We have not gone into this subject further than to note that ophthalmia neonatorum is a less frequent cause of the eye condition in those admitted at the present day than in 1873. Dr. Charles A. Oliver, in a personal communication, has informed me in regard to a peculiar family type of blindness of which he is collecting data for a future publication—*i. e.*, optic atrophy sequent upon retro-bulbar neuritis, beginning at about the age of adolescence, and, as a rule, attacking the males through unaffected mothers (atavism), which is so common in hereditary eye affections, and without other gross evidence of neural disease. The optic atrophy, as pointed out by Prof. Norris and others, is very insidious, taking many years, as a rule, before blindness occurs. Three cases of this type—two brothers and one sister—are pupils at the Institution, and are included among the subjects of this investigation.

There were ninety-five boys and eighty-five girls examined from the school, and a number of observations of blind adults connected with the Institution, as teachers or assistants; one of these latter being of the rarer case of a congenitally totally blind man, sixty-five years of age.

The average age of the male pupils was fourteen years and ten months; the average age of the female pupils was fifteen years and five months.

The pupils are gathered from thirty-six counties of Pennsylvania

[1] "Should the Use of Tobacco in all its Forms be Interdicted in Schools for the Blind?" By Edward E. Allen. Transactions of the Fourteenth Biennial Meeting of the American Association of Instructors of the Blind, 1896.

[2] For a recent full dissertation on causation of blindness in general, see A System of Diseases of the Eye (Norris and Oliver), vol. ii. pp. 419–462, article by I. Minis Hays, M.D.

[3] "Report of an Examination of 167 Inmates of the Pennsylvania Institution for the Instruction of the Blind." The American Journal of the Medical Sciences, April, 1873.

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and New Jersey. Upon examination it was found that about one-half were taken from Philadelphia. As seen, most of them came from the centres of population, due perhaps more to the number of cases of blindness being in proportion to the number of inhabitants; and, secondly, to environment we may attribute a disproportionate increase of eye diseases in crowded communities, dependent upon trauma and an increase of pathogenic bacteria and media for propagation. That modern sanitation and hygiene of the eye are causing fewer cases of total blindness, appears from studying the reports of this Institution, and, in the consideration of the plans for a new building soon to be erected at Overbrook, it has not been deemed necessary to accommodate more than 200 pupils, perhaps a fair representation for Eastern Pennsylvania; there being another school of fifty pupils at Pittsburg.

The point is made to accept only educable young pupils, so that these investigations bear on the medium classes chiefly.

HEARING. As a rule, this sense is highly acute in the blind. In testing the special sense of hearing the following was observed: The pupils were taken one at a time into the quiet of a gymnasium-hall, and permitted to move, guided noiselessly over the smooth floor toward a watch which was suspended from a bar situated at some distance from the farther wall or other resounding medium; the watch was lowered or elevated for each pupil tested, so as to bring it on a level with the ear. The head of the subject was projected toward the right, and the scholar requested or allowed to find the position of greatest acuity, when a fixed scale of feet and inches marked upon the floor gave the hearing distance. The position was now reversed, and the test made with the opposite ear. About ten minutes was the time-limit for each testing, so that the results are accurate and practical.

In some subjects it took a much longer time to make the test, which, however, was never hurried. The same watch was employed in all tests.

In less intelligent pupils it often took a much longer time-limit to make the hearing-test, but the distance of recognition in such was not lessened as compared with that of the normally mentally healthy: a psychological obtundity!

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PARTIAL TABULATION OF RECORDS EMBODIED IN THE TEXT.

MALES.

Mental condition.	Physical condition.	Senses, hearing, etc.	Senses, acute touch, etc.	Nystagmus.	Degree of blindness.	Supposed cause.	Chest measurement.	Position of head in walking.	Spinal curvature and skeleton.	Heart and lungs.	Shape and circumference of head.	Teeth and mouth.	Muscular development, atrophy.	Diathesis, tubercular, etc.	Temperament.	Age afflicted.	Reflexes, knee and elbow muscular jerks.
Aver'ge good 75 p.c.	Aver'ge good 80 p.c.	All generally acute.	All; and muscle sense acute also.	Constant rotary 83 p.c. Slight rotary 6 p.c. Right 1 p.c. Left 1 p.c. None 8 p.c. Lateral 6 p.c.	Partially 68 p.c. Total 32 p. c.	About same as in females.	Inches. Aver'ge 28½ Aver'ge expansion 2¼	Normal 85 p.c. Right 3 p.c. Left 6 p.c. Rolling 6 p.c. *Gait*, normal 70 p.c. hesitating 30 p.c. *Station* normal.	Posterior lateral curvature 36 p.c.	*Lungs*, normal 82 p.c. Fair 9 p.c. Poor 9 p.c. *Heart*, normal 66 p.c. arrythmic 22 p.c. irritable 12 p.c.	Inches. Aver'ge circumference 21¼ Negroid 1 Microcephalic 2 boys.	*Teeth*, good 80 p.c. poor 20 p.c. *Mouth*, normal except 1 dr'wn to right *Tongue*, normal 80 p.c. protruding 20 p.c.	Good 82 p.c. Fair 9 p.c. Bad 9 p.c. No local atr'phy recorded.	Phth. dia. 18 p.c. Phth type 8 p.c. Phthisinoid chest. 10 p.c. Rheum. 1 p.c. Scrof. 6 p.c. Norm. 60 boys.	Nerv'us 78 p.c. Lymph. 14 p.c. Sang'n 3 p.c. Bilious 10 p.c.	Aver'ge age 4 years.	*K. J.* normal 86 p.c. quick 53 p.c. dimin. 8 p.c. absent 3 p.c. *E. J.* normal 81 p.c. quick 12 p.c. dimin. 7 p.c.

FEMALES.

Mental condition.	Physical condition.	Senses, hearing, etc.	Senses, acute touch, etc.	Nystagmus.	Degree of blindness.	Supposed cause.	Chest measurement.	Position of head in walking.	Spinal curvature and skeleton.	Heart and lungs.	Shape and circumference of head.	Teeth and mouth.	Muscular development, atrophy.	Diathesis, tubercular, etc.	Temperament.	Age afflicted.	Reflexes, knee and elbow muscular jerks.
Aver'ge good 80 p.c.	Aver'ge good 75 p.c.	All generally acute.	All muscle sense acute.	Constant rotary 54 p.c. Slight rotary 43 p.c. Right eye 5 p.c. Left eye 1 p.c. None 2 p.c.	Partially 69 p.c. Total 31 p.c.	Op. neon. 19 p.c Traum. 10 p.c. Cong. catar. 6 p.c. Scarlet fever 4 p.c. Congenital 45 p.c. Miscel. 16 p.c.	Inches. Aver'ge 26 expanded 2⅓	Normal 69 p.c. Right 16 p.c. Left 11 p.c. Rolling 4 p.c. *Gait*, normal 69 p.c. hesitating 31 p.c. *Station* normal.	Posterior lateral curvature 45 p.c.	*Lungs*, normal 66 p.c. fair 20 p.c. poor 14 p.c. *Heart*, normal 40 p.c. arrythmic 30 p.c. irritable 15 p.c. feeble 15 p.c.	Inches. Aver'ge circumference 20.8 Negroid 1 Microcephalic 1 girl.	*Teeth*, normal. *Mouth*, normal. *Tongue*, normal 70 p.c. protruding 30 p.c. Prognathous 1 girl.	Good 60 p.c. Fair 18 p.c. Bad 22 p.c. None local.	Phth. diath. 33 p.c. Phth. type 10 p.c. Rheum. 5 p.c. Scrof. 10 p.c. Normal 30 girls	Nerv'us 66 p.c. Lymph. 22 p.c. Sang. 7.3 p.c Bilious 4.7 p.c.	Aver'ge age 5 years.	*K. J.* Normal 40 p.c. Quick 45 p.c. Dimin. 10 p.c. Absent 5 p.c. *E. J.* Normal 62 p.c. Quick 30 p.c. Dimin. 7 p.c. Absent 1 p.c.

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It will be noted in the tests for hearing that there is a wide range of difference in the large majority of cases as to the acuity of audition between the right and the left ear.

The average distance for the left ear in the boys was about fourteen feet, while that for the right ear was about fifteen feet. The average in the girls was for the right ear thirteen feet, and for the left ear twelve feet. One case was almost totally deaf; some in one ear only. Ear disease was not prominent enough to alter the disparity between acuity of hearing in each ear in the sum total. Tests were made in classes as they stood in the school. It would appear that greater acuity of hearing in one ear as compared with the other in blind persons, where the auditory organs are normal, may depend upon education of the one sense organ beyond that of the other; for in observation of their attitude when addressed it will be frequently noted that one side of the head is presented toward the origin of sound, and with cultivation of this habit it would seem reasonable that the auditory centres become more specialized on the practised side. No doubt, too, differences of the same nature within less bounds would be noted in the seeing with a normal aural development.

A series of tests to act as checks should be made upon those with normal vision and hearing, to make the above study complete. I have been unable as yet to make this observation on a series of seeing pupils. Inquiry at the Penn Charter School revealed that such was not recorded there among the 400 pupils. A series of tests upon eight teachers at the Institution shows more equality and regularity, but none heard as far as some of their blind pupils.

An investigation into the fields of audition, suggested by Dr. Oliver, would be of scientific value. That there is in a measure a "deaf area," probably produced, as Dr. Oliver suggests, by the auditory impulses being situated in a position outside of the two auditory fields, is easily shown by snapping a spring in the different circumferences from without in, when an irregular field of audition is ascertained, much depending on shape of the head and pinna. The blind, or seeing, too, are often mistaken to locate such a sharp sound when made in the median line near the occiput or chin, the reference frequently being reversed.

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EYES. When we come to study the eyes in a general way as bearing upon certain peculiarities of movements and posture of the head, the effect on carriage and manner of progression, there is also a wide range of difference in the pupils of the school with different stages or degrees of affection of sight. One peculiarity that struck me very forcibly was the forward drooping of the head and of the lateral position of the head, depending upon the side at which rays were excluded from the retina or fovea.[1] In many such cases the scholars carried the head in walking toward the side of greatest obliteration of entrance of rays. This, of course, in the majority of such cases is probably due entirely to the attempt in obtaining a clearer picture of objects immediately in front of the person—*i. e.*, in the direct line of walking. When such scholars were at rest the constrained position was very often relieved with the renewed confidence of repose. But when their attention was attracted anew, whether by ocular reflex or by other avenues of ingress in the reflex arc (as by hearing), the head would habitually assume the position again, originally initiated by the ocular defect described above. For example, speaking suddenly to such a pupil, even when not in front of him, would frequently cause him to place the head to the acquired habit-position as when searching for vision, thus appearing as though he were deaf in one ear—a deception.

Extreme tilting[2] of the head to one side may in some cases be due to the interesting phenomena first suggested by Dr. S. Weir Mitchell, and at experimentation confirmed by Oliver, that rays entering the temporal side are more acutely perceived.

In those partially blind, where the scotoma from corneal disease was central, invariably the head was not held in any fixed position during progression, but was rather rolled about in the same effort to view and clear surrounding objects. We are thus apt to misjudge the mental capacity of a blind person when noting these movements alone, or expressions of countenance and grimaces, induced by efforts to see. Where the blindness has been, from the beginning, complete and sudden, and there is no irritation from the

[1] This same phenomenon has been frequently noted by the writer in partially blind horses and horsemen designate such animals "stiff-necked."

[2] Brain, 1895 (winter number).

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eyeballs or cornea, such movements are, as a rule, much more infrequent or limited. In taking an average of the cases we feel that total blindness produces in itself more concentration of the other senses, with a less waste of energy in the vain attempt to see, when the vision is blurred beyond useful help in recognizing surroundings. Indeed, Mr. Allen tells me that many of these pupils, almost totally blinded, do not progress as rapidly in reading the "blind" relief-letters as do those in whom sight is an impossibility. In teaching at the school a screen is often placed between the reading card and the eyes, to prevent futile efforts at seeing; therefore, to concentrate the more that subtle, delicate sense of touch which is remarkably accentuated in the healthy congenitally blind (though our crude manner of testing with instruments does not demonstrate this); and in those acquired cases of blindness, otherwise normal, the touch-sense becomes notably improved beyond that of the seeing. We were struck with this phenomenon developing in a boy[1] rather suddenly blinded from a traumatic central lesion, reported elsewhere. He had been extremely awkward in the tactile ability of the fingers; but now, after over three years' imperative training, all his motions have become much more stable and the sense of touch highly developed. The tactile sense in the man, sixty-five years of age (a "runner" about the Institution), is very acute. This is the one recorded as congenital.

Muscle sense is better in the blind than in the seeing, and aids them much. Their sense of smell is also acute, often permitting the blind to distinguish individuals by olfaction alone. An exceptional instance, however, of this same acuity of the sense of smell in an intelligent physician of normal sight is known to the author. The sense of taste may become highly specialized, as in two blind people known to the writer outside of this analysis.

Nystagmus. This is a mooted point as to etiology and its significance in disease. Generally, aside from the ordinary causes, we have in the blind very frequently an abortive or nystagmoid motion, less constant in the irregular movements than the typical lateral rhythm described in text-books. Dr. A. Thomson tells me

[1] Philadelphia Polyclinic, June 15, 1895.

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this is due in many cases in large part to lack of fixation ; the stimulus for muscle co-ordination is therefore wanting. Sometimes the irritable fundus, too, is the cause of such shifting, due to attempts to exclude the light rays. In simple optic atrophy and sequent total blindness most cases seem to have the lateral nystagmus more marked, even if the other irregular movements obtain. No doubt the more direct pull of the lateral recti muscles is the cause of this, due to improper control, just as in paralysis of a limb the flexor and stronger muscles cause contractures due to the same lack of inhibition.[1] The nystagmus in albinos is also a type of irregular motion due to photophobia from lack of the dark modifying pigment.

With the kind permission of Dr. Geo. C. Harlan, Ophthalmologist to the Institution, we have been able to study his records of forty-three girls (and forty-five boys). For the girls, of the remaining forty-two we have made this observation, with the following results, *in toto*, viz : forty-six girls, or 54 per cent., had a constant marked rotation of the eyeballs, of which nineteen were irregular lateral or nystagmoid ; thirty-seven had a less marked, slight rotary movement, or in about 43 per cent. of the eighty-five girls. Of this number there were also five who had nystagmus in the right eye. One had it in the left eye only. In two girls (less than 3 per cent.) there was no nystagmus.

For the boys we also examined for this phenomenon in the remaining fifty, with the following result for all males (ninety) : 83 per cent. had constant rotary nystagmus, 6 per cent. had slight rotary, 6 per cent. had lateral alone, 3 per cent. had no nystagmus. Of the males also 1 per cent. had nystagmus in the right eye only, and an equal number had it in the left eye only.

This sign bore no relation to the degree of blindness ; but it seemed that those with iritis, or where corneal disease had extended to the iris or ciliary body, the movement was of greater excursion and irregularity. Of those in which the disease was of the optic nerve or of central change, the lateral movement was more apt to be prominent. Dr. C. A. Veasey has made this

[1] Since the reading of this paper Dr. Wm. Zentmayer has suggested to me the possibility, in some cases, of the nystagmus being in part due to nature's effort to include as many as can be of all the retinal rods and cones in all the fields of such disabled eyes.

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clearer to me. It was also noted, as stated, that the head position referred to above in an attempt to see through some particular eccentric clear media probably tired the lateral muscles and constantly aggravated this condition.

Explanation of these different sorts of eye motions may depend on extent of peripheral irritation of the twigs of the third nerve supplying the stronger internal lateral muscles, as well as others. This is especially true where the third-nerve centre is involved alone, the other ocular nerves escaping. Were the sixth (abducent) nerve irritated or palsied alone, this phenomenon would also follow; same with the fourth (pathetic).

Pupillary reflex has bearing only on degrees of blindness, or intercurrent organic nervous disease. Dr. Harlan[1] found only three with no pupil response from stronger stimulus, even in total blindness and where the media were clear. Fifty-eight of the girls were partially and twenty-seven were totally blind. 68 per cent. of the *boys* were partially and 32 per cent. were totally blind.

I questioned a number of cases becoming blind after the fifth year by trauma or disease, and found the new condition had produced a greater sensitiveness and awkwardness than did blindness occurring in other pupils before about that year; or especially where, as noted above, the defect was congenital. An exception to this rule is in the case of a young colored man blinded late in life; he is bright and cheerful and in fine vigor, mentally and physically.

Idiopathic optic and other nerve-tissue degenerations obtain, no doubt, oftener than we can determine; but diathetic causes of blindness, of course, are the much more frequent. Both should be given full weight before a *stigma* of degeneration is assumed. One of the brightest boys in the school is G. H., one of the three cases of *family type* of hereditary blindness referred to under *etiology*. At the recent annual oratorical contest of the Friedlander Society at the Institution we awarded this intelligent boy of fourteen years the highest average for his junior *recitation* and for his wonderful dexterity in reading of a senior *composition;* these over many pupils older than himself.

The philosophical bearing of a number of diathetic congenital

[1] University Medical Magazine, December, 1896.

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cases (with undoubted specific blood taint) was notable ; and their casual mention of other blindness in their families and ancestry was a reminder of the extent to which heredity can mould the mental state in this rarer class of blind persons.

DIATHESIS. *Girls:* There were twenty-eight cases (33 per cent.) of phthisical diathesis when chest development was especially referred to. Of rheumatic, there were five girls, or about 5 per cent.; 10 per cent. were of tubercular type ; nine girls among the younger children were scrofulous, as shown by broken-down glands or excess of lymphatic tissues in the nasopharynx (about 10 per cent.). Three cases showed well-marked signs of specific taint. This leaves less than half with no distinctive marks of disease tendency ; but it will be found that these girls are of less vitality than the seeing of corresponding ages. We propose using the circumference measurements of the chests at the different ages to compare with a series of the similar measurements in the seeing. This, with the weight and height, compared with the seeing, may be of some import for obtaining vital statistics. The use of the blowing machine gives fallacious records, for so much is dependent upon will-power here.

Boys: Among the boys, 13 per cent. were of phthisical diathesis, as especially shown in chest formation. Again 8 per cent. were of less chest-distinctive phthisical type ; 10 per cent. were manifestly tuberculous, without active symptoms or actual lesions ; over 1 per cent. (or one) were of rheumatic diathesis ; and among the small boys 6 per cent. were scrofulous, several having scars of glands of neck in evidence. Withal, we found no case of Pott's disease or of hip disease among the number of both sexes.

Specific taint was noted distinctly marked in six boys ; suspicious in as many others. The dormancy of predisposition to disease in these pupils is quite general, and must, no doubt, be due (in the class of hereditary cases just referred to) to progenitors' intermarriage with healthy stock.

Chorea had existed in half a dozen boys and girls. Many were what is best termed "fidgety." There were no cases of Bright's disease ; none of cretinism, myxœdema, nor of visceral transposition.

CO-ORDINATION. *Station:* Other than a slight sway in no particular direction (and excluding their common, peculiar habit of

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"swaying" when sitting or standing), this phenomenon could not be termed abnormal. There was no case of organic cord disease, and but one of muscle dystrophy. Of the girls, thirty-eight stood still; forty-seven had the habit-sway of the body or some other rhythmic motion, or of slight twitching of fingers. The same proportion obtained for the males. Imperative movements of trunk and hands existed to a marked degree in a boy and a girl, both cases of mental enfeeblement.

GAIT. *Girls:* Hesitation in twenty-seven, and in forty-six the gait seemed quite normal. In three cases the gait was distinctly halting and waddling, while one might be termed extremely awkward; all the above bearing no relation to degree of blindness. All, too, were outside the bounds of pathologic gaits, which obtained in slight spastic form in two cases of mild cerebral palsy. In seven the amount of assurance in walking for almost totally blind girls (much more so for the boys) was remarkable. They seemed to know quickly from other cultivated senses, as by reflection of sound, their approach to an object, and scarcely ever were they injured. One girl was seen swinging under a porch in great glee, with a closely measured precision just permitting her head to escape the stairs behind.

The manner of getting about the school-yard of the boys, and their playing of games, surprises one many times. The less unnatural adeptness at the dinner-table shows well for the tri-daily training over good food. For breach of behavior we saw one boy, standing by a side table, calmly waiting his provision.

Boys: There was less trepidation among the boys as compared with the girls. Three were cerebro-spastic cases, which, of course, hampered progression, as did the muscle dystrophy.

DEFORMITIES. In thirty-eight *girls* (45 per cent.) there were postero-lateral curvatures of the spine in varying degrees, none enough to place them among orthopedic cases. This was due to asymmetry of the limbs in a few cases; in the remaining, being probably caused by faulty position maintained in childhood before coming under gymnastic training. Stooped shoulders and carrying the head forward or laterally were the other habit-positions more commonly seen in both sexes, and which exercises are tending to dissipate.

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There was one each of acromegalic, microcephalic, hydrocephalic males.

Of the *boys* thirty-four, or 36 per cent. less than in females, had noticeable abnormal curvature of the spine. Greater freedom in thoracic expansion may account for this latter, as compared with the, as a rule, less active and more sedentary females. The use of the "Bobrick" adjustable desk of Dr. Hartwell, of Boston, is a help in preventing stooped shoulders, etc., the pupils of necessity being ill-graded as to ages.

It must be remembered, too, that physically and mentally greater or less differences are found from year to year between girls and boys of the Institution. Thus, one year may change much the number of weak or of strong proportionally; hence our examinations are relative. Thus, in Mr. Allen's collection[1] of data (the comparison of *weight, height,* and *lung capacity* of a composite of all the boys in the Institution at one time), it is found that, as compared with Dr. Sargent's anthropometric charts for normal persons of like ages and sex, taken from examinations of thousands of children, the standing of the blind boys was only 12 per cent. (or 38 per cent. below the average); while that of the blind girls of the school was, in similar comparison with normal females, 25 per cent. (25 per cent. below the average). Fallacy could only come in here when we remember the *lack* of will-power, mentioned above; also of the novelty of blowing into a cylinder which would intensify this instability existing in the blind. They certainly can be educated in this latter proportionately more rapidly than can the seeing, who will frequently make their best effort immediately after being shown what is expected.

Of the 150 pupils included in this average, only seven were above the average (50 per cent.). Examinations for next year may yield much different and bettering results, brought about by the efficient gymnasium work. Among the exercises given it is interesting to observe the accuracy with which a sudden turn is made at command, and how one pupil takes the place of another with exactness, no one being brushed against. Such training is a large

[1] See Report for 1897, now in press.

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factor in securing confidence and stability for the blind. Such, too, is the advantage of games skilfully guarded by teachers, as we observed in the kindergarten. Physical culture of the blind must, of necessity, carry out the ideal method—*i. e.*, correlation of muscles and mind. They cannot imitate, and therefore act as mechanically so much—a notable feature in very young children and in cases of mental enfeeblement. Withal, the surprising excellence among blind classes, as compared with the seeing, is striking, and *is proof of urgent gymnastic need of the former.*

This contrast of observing classes of normal physiques and high intellection in gymnastics, in order to compare with the movements of the blind, was afforded the writer by Prof. G. H. Cliff, at the Philadelphia Girls' Normal School, where the first (in 1894) system of physical training in "common-sense" dress was established in Philadelphia. Here such training has enhanced the interest in teaching and health benefit for beginning teachers. Singularly, few physicians consider well, or, indeed, know of this wise provision of the Public Schools, overseen by capable teachers.

The pupils at the Institution for the Blind have, following this, the proper dress and efficient instructors in physical education.

REFLEXES AND SENSORY STATUS. There were no sensory changes recorded among the pupils.

Among the *boys* the knee-jerk was normal in 36 per cent., quick in 53 per cent., diminished in 8 per cent., absent in 3 per cent. (case of dystrophy). The elbow-jerks were normal in 81 per cent., quick and unaccounted for in 12 per cent., and diminished in 7 per cent. Muscle-jerks were seldom abnormal, although a "quick response" was the frequent note made. Skin reflexes were also active. Among the *girls* 40 per cent. had normal knee-jerks, 45 per cent. a quick knee-jerk, 10 per cent. diminished, and the knee-jerk was absent in 5 per cent., without lesion to account for. In them the elbow-jerk was normal in 63 per cent., quick in 30 per cent., diminished in 7 per cent., absent in 1 per cent.; the muscle-jerks being, as a rule, quick.

The sense of surprise may be the most potent cause of increased reflexes, as pointed out to me by Dr. Mitchell. Reaction-time in the blind, as shown by hearing-tests, is acute and active.

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HEART. *Males:* Normal, 66 per cent.; arhythmic or intermittent, 22 per cent.; irritable, 12 per cent. No organic murmurs were found. Anæmic bruits at the left base were noted in several.

Females: Normal, 40 per cent.; arhythmic, 30 per cent.; irritable, 15 per cent.; feeble, 15 per cent.; anæmic murmurs were heard at left base, with a bruit in the veins of neck in six.

LUNGS. *Males:* Normal, 82 per cent.; average expansion in 9 per cent.; poor capacity or expansion, 9 per cent. There was no discoverable lung lesion. Several chronic (tubercular) pleurisies existed.

Females: Normal, 66 per cent.; average, 20 per cent.; poor chest capacity, 14 per cent. Incipient phthisis existed in two cases.

The surprise is that more heart or lung diseases did not exist among the 180 pupils.

CHARACTERISTICS OF THE BLIND. (Of 180 pupils of average intelligence.) The blind, as a class, seldom present that *intense mental clearness* of the seeing. As to peculiar traits of mind in the blind or no, we cannot, therefore, agree with the modern French school (at variance, however, with their pioneer, M. Diderot, whose classic *Essay on Blindness* (1773) is still authoritative, being reprinted in English so recently as 1895), that the "blind are but seeing-people in the dark;" for a person in perfect vision appreciates full well his coming liberation, whereas a blind person has no such outlook, and mental characteristics must diverge in peculiar lines among them. Thus, it is often said the blind have better memories, but this should be accepted with restrictions. They certainly do memorize well things and events not appreciated, supplemented, or assisted by that valuable ocular demonstration; but they have not better general memories for events, as noted in the pupils at the Institution for the Blind, when compared with the seeing of like ages and station in life. In recording head or chest measurements in the dictation of a case study, it sometimes happened that the head or chest circumference, or other figures, were not recorded, and in such instances, no matter how remotely, the pupil would always be able to give the exact figures spoken, as proven by remensuration. Of course, we are excluding the hereditary

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cases of mental and physical weakness from this reckoning of mind capacity.

One girl, blind since infancy, in perfect physical health and of average intelligence, could go about her father's farm with wonderful certainty. Another girl, becoming blinded late in life, had been extremely awkward after the injury that destroyed her sight. Again, the finer sensibility of the female shows itself in the mental depression and the acquired nervous temperament predominating in them as compared with the boys. In those having a natural hereditary tendency to music, among the girls at least, cultivation of the Cecilian art will far more complement the loss of sight than in the non-musical. The plaintive tones of several of the girls at their annual concert last spring was favorably commented upon by competent critics. The musical development in the male under like circumstances seemed to be more mechanical. The therapeutic possibilities of music are great in any station of life, stimulating mind and body through increased metabolism. An excellent article on this subject appears in the *Journal of Mental Science* for November, 1897.

TEMPERAMENT. The nervous temperament existed in 56 girls, or 66 per cent.; the lymphatic temperament in 19 girls, or 22 per cent.; the bilious temperament in 4 girls, or 4.7 per cent.; the sanguineous temperament in 6 girls, or 7.3 per cent.

In the whole number of girls the hereditary temperament was much modified by what may be termed an acquired, mild general nervousness. Among the boys the percentages were as follows: Nervous temperament, 73 per cent.; lymphatic temperament, 14 per cent.; sanguineous temperament, 3 per cent.; bilious temperament, 10 per cent. While the percentage of frank nervous temperament was higher among the males, yet the condition of general nervousness did not pervade so many. Lack of sensual control being more widespread, too, in the male may account for increase of distinct neuroses among them.

ROENTGEN X-RAYS. Drs. Hilgartner[1] and Northrup conclude from the fact that "x-rays" are non-refractive (and from a series

[1] Texas Medical News.

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of experiments upon totally and partially blinded people either from optic atrophy or anterior disease) no aid can be given by this agent toward seeing.

An interesting example of stored-up perverted sight memories, etc., is exemplified in the instance of a man, aged over sixty years, Mr. Allen tells me of. He was blinded at twenty-one years of age. Letters were read to him ever after by a friend, and in his dreams they sometimes took the curious paradoxical form of his receiving a letter, seeing the address upon it and postmark, then handing the contents over to his friend to read aloud.

It is said that children losing their sight entirely before the sixth year never dream of seeing, the mental impression of light not being fixed until after that time. Edmund Parish, in his recent English edition on *Hallucinations and Illusions*, states that the congenitally blind do not have visual hallucinations.

Sudden outbursts of laughter from less ludicrous causes than in the seeing is a noticeable characteristic of the blind children. But few are apt to be morose. Insanity seldom occurs.

In adults with congenital cataract operated upon to the partial restoration of sight, the fact that everything seems almost on a plane is interesting evidence of the absence of ocular demonstrative training that occurs in all of us from babyhood up.

Blood. A minority of the scholars appear pale, and on counting the blood of a half-dozen girls and boys that were most anæmic-looking, we found the following:

	Red blood-corpuscles.	*Hæmoglobin. (Fleischl.)*
Girls.		
J. B., pale, nervous	3,443,333	80 per cent.
J. D., pale, choreic	3,336,666	75 "
A. G., pale, dwarf (specific)	2,727,727	75 "
Average	3,169,242	$76^{2}/_{3}$ per ct.
Boys.		
W. C., pale, nervous, below par mentally	3,075,000	74 "
G. G., pale, great reader, sedentary, lymphatic	4,000,000	80 "
C. W., nervous, bright	3,200,000	70 "
Average	3,425,000	$74^{2}/_{3}$ per ct.

Simple anæmia is, therefore, to be expected in a certain proportion of the blind, due to inactivity and less vitality, as a rule, than

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in the seeing. Out-of-door life in the fresh air and sunshine should be encouraged, and the wearing of a shade or dark glasses enjoined where light-irritation is the cause of remaining indoors. The moving of the Institution to the country is, on this account also, a desideratum.

It is estimated that over a million people are blind; and 50,000 of them were recorded in the United States Census for 1890. These, however, include senile blindness, in proportion of 80 per cent., to 20 per cent. among young persons. The reverse is almost true as to deafness. Of course the majority of these blind referred to are weaklings unable to attend school. When this is considered fully, and from the fact that many *are* educable children, the widespread utility and humanitarianism of schools for the blind are accentuated in their great civil return. State aid could not be to better purpose.

The great advantages of such Institutions are mainly threefold:

1. *Segregation*, producing concentration of work in those particular lines which the blind have, of necessity and training, accustomed themselves to do. This is noticeable among the laboring classes, especially at the Blind Men's Working Home, in West Philadelphia, where a really surprising amount of production is realized by such concentration. None the less is it manifest in study by means of text-books with the *raised* letters, which can be collected together in library form for use among the students of a school.

2. *Similarity* of their physical work creates new thoughts and is a strong mental stimulus to bring out the best efforts of the individual. Pushing the mental training of the blind to a high standard is, however, to be decried, for their nervous capacity is already limited and overwrought. The great advantage of the gymnasium of the Institution is also paramount here, as well as in the obtaining and preservation of physical health.

3. *Restraints and self-restraints*, wisely directed by capable instructors is the third of a trio of requisites in the making of a brighter life for the blind.

My appreciation of the efficient and active aid in this work of Mr. E. E. Allen, Principal of the school, and of the teachers; also the kindly interest of Dr. Richard A. Cleeman, of the Board of Managers, is hereby acknowledged.

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DISCUSSION.

Dr. S. Weir Mitchell: I merely wish to express my regret that such a valuable paper should have been brought forward at a time when the College has so much to do. I should like to have discussed it.

Dr. George C. Harlan: I wish to modify the statement that I found pupillary action in all of the cases of absolute blindness but four. What I stated in the paper referred to (*Transactions of the American Ophthalmological Society*, 1896) was that among the 175 inmates of the institution I could find only three with sound balls and clear media who were entirely without perception of light. In all of these ordinary pupillary reaction to diffused daylight, or to artificial light from the ophthalmoscopic mirror, was absent, but the pupils contracted to direct sunlight. The conclusion was that they were cases of complete cortical blindness, with also anterior lesions which incompletely interrupted the reflex path of pupillary action, necessitating a more powerful impression.

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APPENDIX.

ADDITIONS TO THE MÜTTER MUSEUM IN 1897.

A Collection of over one Thousand Surgical Instruments formerly belonging to Dr. Joseph Pancoast and Dr. William H. Pancoast. Presented by Mrs. W. H. Pancoast.

Enlarged Photograph of the Thoracic Organs (colored). Presented by Dr. George McClellan.

A Number of Gynecological Instruments, and a Series of Obstetrical Illustrations. Presented by Dr. W. C. Goodell.

Specimen of Posterior Proctectomy. Presented by Dr. John B. Roberts.

Specimen of Hydrorrhachis. Presented by Dr. J. R. Bryan.

Specimen of Amputation of the Male Genitalia. Presented by Dr. G. G. Davis.

Ureteral Calculus Removed by Transperitoneal Uretero-lithotomy. Presented by Dr. John B. Roberts.

A Series of Fifty Gynecological Specimens. Presented by Dr. Joseph Price.

Intraligamentary Fibroid Tumor of the Uterus, Complicated with Tubo-ovarian Abscess. Presented by Dr. G. E. Shoemaker.

Vesical Calculi Removed by Dr. Wm. Goodell. Presented by Dr. W. C. Goodell.

Large Cystic Tumor of the Kidney. Presented by Dr. Joseph Price.

Mammary Tumor. Presented by Dr. Joseph Price.

Fibroma of the Uterus. Presented by Dr. Joseph Price.

Fibroma of the Uterus. Presented by Dr. G. E. Shoemaker.

Adeno-sarcoma of the Uterus. Presented by Dr. G. E. Shoemaker.

Degenerating Fibroma of the Uterus, with Pyosalpinx. Presented by Dr. G. E. Shoemaker.

Pyosalpinx. Presented by Dr. G. E. Shoemaker.

Tubo-ovarian Abscess. Presented by Dr. G. E. Shoemaker.

Epithelioma of the Cervix. Presented by Dr. G. E. Shoemaker.

Extra-uterine Pregnancy. Presented by Dr. G. E. Shoemaker.

Malignant Adenoma of Cervix. Presented by Dr. G. E. Shoemaker.

Ovarian Cyst. Presented by Dr. G. E. Shoemaker.

Papillomatous Ovarian Cyst. Presented by Dr. J. M. Baldy.

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Steam Atomizer. Presented by Dr. W. W. Keen.

Three Silver Catheters. Presented by Dr. A. Van Harlingen.

Spring Lancet, formerly belonging to Dr. John L. Atlee. Presented by Dr. W. F. Atlee.

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ABSTRACT OF THE REPORT OF THE LIBRARY COMMITTEE.

THE Library contains 54,097 volumes, exclusive of duplicates; 2112 more than at the time of the last report. Also 33,653 unbound pamphlets, reports, and transactions, an increase of 2653 during the year. A large number of duplicates have been disposed of, leaving only 695 on hand; 31,599 numbers of medical journals have been added to the Library, none of them duplicates.

Twenty-three of the new publications presented were written or edited by Fellows of the College.

There have been 5349 visits to the Library, 165 more than during the preceding year; 2792 books have been taken out, an increase of 607; and 12,754 have been furnished for consultation by the Assistant Librarian, in addition to a large number taken directly from the shelves by Fellows, an increase of 607.

GEORGE C. HARLAN,
Chairman.

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LIST OF PAPERS: SECTION ON OPHTHALMOLOGY.

January, 1897.

Papers. Binasal Hemianopsia, by Dr. Clarence A. Veasey (by invitation).

A Case of Foreign Body in the Vitreous, Diagnosed by Aid of the Roentgen Rays, by Dr. G. Oram Ring.

Two Cases of Extraction of Steel from the Vitreous, by Dr. Edward Jackson.

Clinical Memoranda, by Dr. J. T. Carpenter, Jr., for Dr. S. D. Risley.

Ectropion Uveas; Syphilitic Tarsitis; Purulent Tarsitis, by Dr. G. E. de Schweinitz.

Cases Exhibited. Extraction of Steel from the Vitreous, by Dr. Edward Jackson.

Unilateral Congenital Microphthalmos, by Dr. F. M. Perkins.

Ciliæ in the Anterior Chamber; Result of Operation for Cicatricial Ectropion, by Dr. G. C. Harlan.

Result of Operation for Cicatricial Ectropion; A Sketch Illustrating Rupture of the Retina in Retinal Detachment, by Dr. C. A. Oliver.

February, 1897.

Papers. The Diagnosis of the Presence of a Piece of Steel in the Vitreous and Ciliary Body by the Roentgen Rays, and its removal by the Hirschberg Magnet, by Dr. G. E. de Schweinitz.

Detachment of the Retina and Choroid from Concussion, by Dr. S. D. Risley.

A Successful Operation for the Relief of Cicatricial Orbit; Photograph of Patient, by Dr. G. C. Harlan.

Reparation from Injury of Inner Angle of the Eyelids, by Dr. C. A. Oliver.

Cases. Two Cases of Anomalous Pigmentation of the Retina, by Dr. Wm. Zentmayer and Dr. W. C. Posey.

Foreign Body in the Lens, by Dr. A. G. Thomson.

Instruments Exhibited. Magnifying Lenses for Operating, by Dr. Edward Jackson.

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March, 1897.

Papers. Melanotic Tumors, probably Ciliary in Origin, occurring in Both Eyes, by Dr. M. W. Zimmerman.

Angioid Streaks in the Retina, (illustrated), by Dr. G. E. de Schweinitz.

Improvement in the Sight-hole of the Ophthalmoscope Mirror, by Dr. Edward Jackson.

Localization of Foreign Bodies in the Eye by Means of a Special Apparatus used in Connection with the Roentgen Rays, by Dr. W. M. Sweet (by invitation).

Cases. Traumatic Dislocation of the Lens under the Conjunctiva, by Dr. W. T. Shoemaker for Dr. C. A. Oliver.

Sketch of Thrombosis of the Retinal Vein, by Dr. W. C. Posey for Dr. C. A. Oliver.

April, 1897.

Papers. Report of a Case of Intraocular Tumor, by Dr. E. K. Perrine (by invitation).

Temporary Lesions of the Retina and Choroid from Bruise of the Eyeball, by Dr. Edward Jackson.

The Preservation of Specimens for Macroscopic and Microscopic Examination, by Dr. Edward Jackson.

Case. Intraocular Tumor, by Dr. E. K. Perrine (by invitation).

October, 1897.

Papers. Amblyopia in Horses, probably due to the Toxic Influence of Tobacco, illustrated by Microscopic Sections from Dr. James W. Barrett, of Melbourne, Australia, by Dr. G. E. de Schweinitz.

Bloodvessel Formation in the Vitreous, by Dr. G. E. de Schweinitz.

General Ocular Disturbance following a Blow on the Head, by Dr. S. D. Risley.

Auto-skiascopy, by Dr. Edward Jackson.

Pilocarpin in Non-syphilitic Central Retino-choroiditis, by Dr. Edward Jackson for Dr. H. F. Hansell.

Cases. Two Cases of Rupture of the Pupillary Margin of the Iris, by Dr. P. N. K. Schwenk (by invitation).

Double Congenital Aniridia, by Dr. Wendell Reber for Dr. H. F. Hansell.

Detachment of the Retina, with Restoration of Vision by Scleral Puncture, by Dr. W. M. Sweet for Dr. H. F. Hansell.

November, 1897.

Papers. Transient Pulse of the Retinal Artery, induced by the Application of Homatropin, by Dr. G. C. Harlan.

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Some Cases of Central Amblyopia and their Significance, by Dr. G. E. de Schweinitz.

The Technique of Needle Operations on the Lens and Capsule, by Dr. Edward Jackson.

Cases. Metastatic Irido-cyclitis in both Eyes, causing Blindness, resulting from an Intense Inflammation of the Nose and its Accessory Sinuses, by Dr. W. C. Posey.

Traumatic Third-nerve Paralysis, by Dr. H. F. Hansell.

Cyst of the Orbit, by Dr. W. F. Norris.

HOWARD F. HANSELL,
Clerk of Section.

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LIST OF PAPERS: SECTION ON OTOLOGY AND LARYNGOLOGY.

Should Cultures for Bacteriologic Examination be taken from the Nasal Chambers as well as from the Throat in Suspected Cases of Diphtheria? by Dr. E. Larue Vansant.

Excision of the Tonsils by Means of the Galvano-cautery Snare, by Dr. Joseph S. Gibb.

Fracture of Base of the Skull Involving the Temporal Bone (specimen), by Dr. E. B. Gleason.

(1) Incomplete Exploration for Otitic Cerebellar Abscess; Death; Autopsy. (2) The Importance of Autopsy in Cases of Fatal Meningitis, Apparently Ascribable to Tympanic Inflammation, by Dr. B. Alexander Randall.

Errors in Muscle Co-ordination in the Pharynx and Larynx, by Dr. Harrison Allen.

Foreign Body (iron-staple) in the Œsophagus Revealed by Roentgen Rays; Removed. Exhibition of Skiagraph and Foreign Body, by Dr. Arthur Ames Bliss.

Notes of a Case of Irruption of a Tooth into the Nasal Chamber, by Dr. W. R. Hoch.

Total Aphonia, due to Fleeting Unilateral Paralysis, Involving Several of the Cranial Nerves, by Dr. Bartram H. Potts (by invitation).

Exhibition of a Skiagraph, showing a Large Growth in the Neck, by Dr. E. Larue Vansant.

(1) Extruding Cholesteatoma Rupturing the Drumhead; (2) Case of Attic Caries with Conspicuous Naked Chorda Tympani, by Dr. B. Alexander Randall.

A Specimen of Cerebellar Abscess, with Remarks on Diagnosis, by Dr. L. J. Hammond.

Notes on a Case of Otitic Epidural Abscess Associated with Abscess of Temporal Lobe, by Dr. C. H. Burnett.

A Note on the Use of Electrolysis in the Treatment of Chronic Tonsillar Hypertrophy, by Dr. Frank Woodbury.

Notes on a Case of Herpes of the Pharynx, by Dr. E. Larue Vansant.

Report of a Case of Urticaria of the Pharynx, Producing a Grave Œdema of the Glottis, by Dr. John Madison Taylor.

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A Case of Bilateral Paralysis of the Abductors of the Cords, by Dr. A. W. Cleveland.

Gumma of the Septum, with Report of Cases, by Dr. E. Larue Vansant.

Cases Exhibited.

(1) Patient with Leptothrix of the Pharynx; (2) Patient with Cholesatoma of the Mastoid; (3) Patient with a Naso-Pharyngeal Growth; (4) Patient Showing Results of Mobilization of the Stapes, by Dr. E. B. Gleason.

A Case of Extreme Stammering, by Dr. G. Hudson Makuen.

A Case of Fracture and Stenosis of the Auditory Meatus, Caused by a Fall upon the Chin, with Symptoms Suggestive of Fracture of the Base, by Dr. B. A. Randall.

A Case of Stammering, by Dr. G. Hudson Makuen.

A Case of Excision of Remains of Ossicles and External Bony Wall of Attic, by Dr. B. A. Randall.

A Case of Laryngeal Polyp, with Recovery from Operation, by Dr. A. W. Cleveland.

A Case of Polypus of the Ear, by Dr. E. B. Gleason.

A Case with Peculiar Perversion of the Voice, by Dr. G. H. Makuen.

A Patient in whom a "Stacke" Operation was followed by Persistent Facial Paralysis, by Dr. B. Alexander Randall.

A Patient with a Laryngeal Growth for Diagnosis, by Dr. Joseph S. Gibb.

EUGENE LARUE VANSANT,
Clerk of Section.

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LIST OF PAPERS: SECTION ON GENERAL SURGERY.

December, 1896.

A Case of Indirect Inguinal Hernia in a Child Two Weeks Old, by Dr. Randolph Faries.

A Case of Osteotomy for Deformity Following Fracture of the Lower End of the Radius,with Exhibition of Skiagraphs, Photographs, and Cast, by Dr. M. J. Stern.

A Case of Cured Dermoid Cyst of the Orbit, by Dr. Thomas S. K. Morton.

Exhibition of Photograph and Skiagraph of a Case of Charcot's Disease of the Knee, by Dr. John B. Roberts.

A Case of Pancreatic Cyst Cured by Operation, by Dr. Charles B. Penrose.

A Case of a Large Pancreatic Cyst; Abdominal Section and Drainage; Recovery, by Dr. W. W. Keen.

January, 1897.

An Operation for the Removal of a Myxofibroma of the Root of the Neck, by Dr. Charles H. Frazier.

Remarks on Fractured Ribs in the Aged, by Dr. Thomas S. K. Morton.

Remarks on a Probable Cause for the Frequency of Ununited Fractures of the Humerus, by Dr. John B. Roberts.

February, 1897.

The Removal of a Foreign Body from the Male Bladder, with an Analysis of 221 other Cases, by Dr. Francis R. Packard.

A Case of Sacculated Bladder Improved by Drainage, by Dr. John B. Roberts.

A Case of Death from Rupture of a Suppurating Ovarian Tumor, by Dr. John B. Roberts.

Exhibition of a Needle-holder and the Deportment of Needles Accidentally Broken off after Penetrating the Tissues, and the Method of Extraction when their Location is Known or Suspected, by Dr. O. H. Allis.

Four Cases Simulating Stone in the Kidney for which Nephrotomy was Performed; no Stone Found; Operation Followed by the Disappearance of all Symptoms, by Dr. Orville Horwitz.

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A Case of Tuberculosis of the Stomach Supposed at the Cœliotomy to be Carcinoma; Complete Recovery, by Dr. W. W. Keen.

March, 1897.

The Galvano-cautery in the Surgery of the Tonsil, by Dr. Joseph S. Gibb.

The Tonsillotome; its Limitations, by Dr. Arthur Ames Bliss.

Tonsillotomy, by Dr. John B. Roberts.

Sarcoma of the Tonsil Treated by the Toxins of Erysipelas and Prodigiosus, by Dr. Thomas S. K. Morton.

The Surgery of the Tonsil, by Dr. G. Hudson Makuen.

Sarcoma of the Tonsil, by Dr. J. Chalmers Da Costa.

The Advantages of the Trendelenburg Posture in Operations About the Throat and Mouth, by Dr. W. W. Keen.

April, 1897.

The Result Obtained by Immediate Suture after Complete Division above the Wrist of all of the Flexor Tendons, together with the Vessels and Nerves, by Dr. Alfred C. Wood.

(1) A Case of Ununited Fracture Secured by a Buried Silver Plate, with X-rays Photograph; (2) Cases Showing the Functional Result after Removal of the Pectoral Muscles for the Cure of Cancer of the Breast; (3) A Case of Chronic Appendicitis Complicated by a Fibroid Tumor of the Cæcum, by Dr. Edward Martin.

The Surgery of Supernumerary Digits and also Lateral Curvature, by Dr. Randolph Faries.

A Rare Complication during Litholapaxy, by Dr. Alfred C. Wood.

(1) A Case of Schede Operation for an Old Empyema; Drainage by Cathcart's Method, Recovery; (2) Œsophagotomy for the Removal of a "Jack-stone" in a Child Fourteen Months Old, by Dr. W. W. Keen.

May, 1897.

Certain Malignant Cystic Tumors of the Breast; and a Brief Consideration of the Results of the Surgical Treatment of Carcinoma of the Breast, by Dr. W. S. Halsted.

The Method and Value of Immediate Microscopical Examination in Suspected Malignant Growths, by Dr. D. Braden Kyle.

October, 1897.

Exhibition of a Patient on Whom was Performed Successful Excision of the Subclavian Vein for Secondary Carcinoma; A Note on a Novel Method of Hastening Consolidation in Delayed Union of Fractures, by Dr. John B. Roberts.

The Sterilization of Catgut by the Jefferson Method, by Dr. W. W. Keen.

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Preliminary Report of a Case of Gunshot Wound of the Lung, by Dr. J. Chalmers Da Costa.

November, 1897.

Exhibition of Patient who is Wearing a Second Modification of an Antero-posterior Support for Pott's Disease, by Dr. Randolph Faries.

Removal of the Penis and Testicles for Epithelioma, by Dr. Gwilym G. Davis.

A Case of Excision of the Breast by Kocher's Method, by Dr. George B. Wood.

The Operative Treatment of Pneumothorax and of Pyothorax; also an Operation for the Relief of Scaphoid Sternum, or Shoemaker's Breast, by Dr. W. Barton Hopkins.

A Case of Cyst-sarcoma of the Omentum, also on the Use of Gloves in Surgical Operations, by Dr. W. W. Keen.

ALFRED C. WOOD,
Clerk of Section.

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LIST OF PAPERS: SECTION ON GENERAL MEDICINE.

The Strawberry Tongue in Scarlet Fever, by Dr. M. Howard Fussell.

A Medical Lecture of 1804, by Dr. E. W. Watson.

The Examination, for Clinical Purposes, of Hydrochloric Acid in Gastric Contents, by Dr. David L. Edsall. (Read by invitation.)

Relative Value of Digitalis in the Heart of Childhood, by Dr. H. A. Hare.

Presentation of a Case of Horseshoe Kidney, by Dr. James C. Wilson.

The Diagnosis of Atheroma of the Arch of the Aorta, by Dr. Alfred Stengel.

The Ball Valve Stone in the Common Duct, by Dr. William Osler.

Exhibition of Widal's Method of Serum Diagnosis, by Dr. S. S. Kneass. (Read by invitation.)

A Contribution to the Study of Spinal Syphilis, by Dr. William G. Spiller. (Read by invitation.)

The Influence of Rest, Dry Diet, Venesections, and Calcium Salts upon the Blood of Cases of Aneurism, by Dr. A. E. Taylor. (Read by invitation.)

The Value of the Various Preparations of Digitalis, by Dr. H. A. Hare.

Exhibition of a Myxœdematous Patient showing Marked Improvement from Thyroid Extract, by Dr. D. J. Milton Miller.

Presentation of a Patient presenting an Interesting Physical Sign, and the Report of a Case of Biliary Cirrhosis, by Dr. James Tyson.

A Brief Statistical Paper on Enteric Fever in Children, based upon 150 Hospital Cases, by Dr. James Wilson.

Presentation of Photographs and Report of two Cretinoid Brothers, by Dr. C. W. Burr.

The Condition of the Salivary Digestion in Anæmia, by Dr. S. M Hamill.

The Gastric Conditions in Anæmia, by Dr. David L. Edsall. (Read by invitation.)

A Case of Locomotor Ataxia, with Perforating Ulcer of the Toe, by Dr. Herman B. Allyn.

Methods of Prescribing Diet in Private Practice, with Presentation of a Diet Sheet, by Dr. F. A. Packard. The discussion of this paper was opened by Dr. James Tyson and closed by Dr. J. M. DaCosta.

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Ventricular Aneurism Secondary to Myocarditis, with Presentation of Specimens from a Case, by Dr. Henry Morris.

Two Cases of Death without Discoverable Cause, by Dr. M. Howard Fussell.

Delayed Resolution in Pneumonia, and its Treatment, by Dr. Alfred Stengel.

SAMUEL M. HAMILL,
Clerk of Section.

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LIST OF PAPERS: SECTION ON GYNECOLOGY.

January 21, 1897.

A New Method of Suturing the Abdominal Wound in Cœliotomy, by Dr. Charles P. Noble.

The Necessity of Early Inspection of the Vagina in Puerperal Sepsis, by Dr. R. C. Norris.

February 18, 1897.

Operative Treatment in Prolapse of the Ovary; Two Cæsarean Sections; A Case of Septic Salpingitis of Curious Origin; Iniencephalus, by Dr. B. C. Hirst.

March 18, 1897.

Cases in which Antistreptococcic Serum was Used, by Dr. B. C. Hirst.

A Case of Puerperal Septicæmia Successfully Treated with Antistreptococcic Serum, by Dr. R. C. Norris.

Septicæmia Following Criminal Abortion; Serum Injection; Autopsy; Bacteriological Report, by Dr. George Erety Shoemaker.

A Marked Result in the Treatment of Puerperal Sepsis Obtained by the Use of Serum, also, A Failure of the Same Method of Treatment, by Dr. E. P. Davis.

A Case of Acute Lymphangitis and Phlebitis Treated with Antistreptococcic Serum, by Dr. J. M. Baldy.

Statistical Report of Cases of Puerperal Sepsis Treated with Antistreptococcic Serum, by Dr. J. B. Shober.

April 15, 1897.

A Case of Eclampsia Successfully Treated with Enormous Doses of Viratrum Viride, by Dr. J. B. Shober.

A Case of Pyæmia in a Young Infant, by Dr. John C. Da Costa.

Two Cæsarean Sections—one for Dermoid Cyst Impacted in the Pelvis; the other for Flat Rhachitic Pelvis and Overgrown Child, by Dr. B. C. Hirst.

May 20, 1897.

A Case of Varicose Veins of the Broad Ligament, by Dr. J. M. Baldy.

Clinical Notes: (1) Cœliotomy during Pregnancy; Recovery. (2) Large Polyp with Eversion of the Uterus. (3) A Large Dermoid Cyst Removed Nine Weeks after Labor, by Dr. John C. Da Costa.

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October 21, 1897.

A Discussion of the Anatomical Points Involved in Emmet's Method of Operating upon the Perineum in Laceration of the Second Degree, by Dr. W. Reynolds Wilson.

Three Cases of Hysterectomy, by Dr. John B. Deaver.

A Case of Ovarian Sarcoma in a Girl Sixteen Years Old. Two Cases of Pelvic Inflammatory Disease in which the Use of Murphy's Button became necessary. Papillomatous Cyst of Ovary; Removal, by Dr. J. M. Baldy.

November 18, 1897.

Cæsarean Section and Symphysiotomy, with Report of Cases, by Dr. Edward P. Davis.

Three Cases of Fibroid Uterus; Specimens. Pyosalpinx intermittently Draining through Uterus. Two Ovarian Cysts, by Dr. George Erety Shoemaker.

Acute Strangulation of Prolapsed Uterus, by Dr. H. D. Beyea.

Acute Strangulation of Prolapsed Uterus, by Dr. J. M. Baldy.

December 16, 1897.

Early Rupture of a Tubal Pregnancy; Cœliotomy; Recovery, by Dr. Robert G. Le Conte.

A Case of Restoration of the Urethra after Eleven Unsuccessful Operations, by Dr. Charles P. Noble.

A Case of Intestinal Obstruction following an Abdominal Section, by Dr. J. M. Baldy.

The Enucleation of a Parovarian Cyst without Removal of its Ovary or Tube, by Dr. H. D. Beyea.

JOHN B. SHOBER,
Clerk of Section.

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